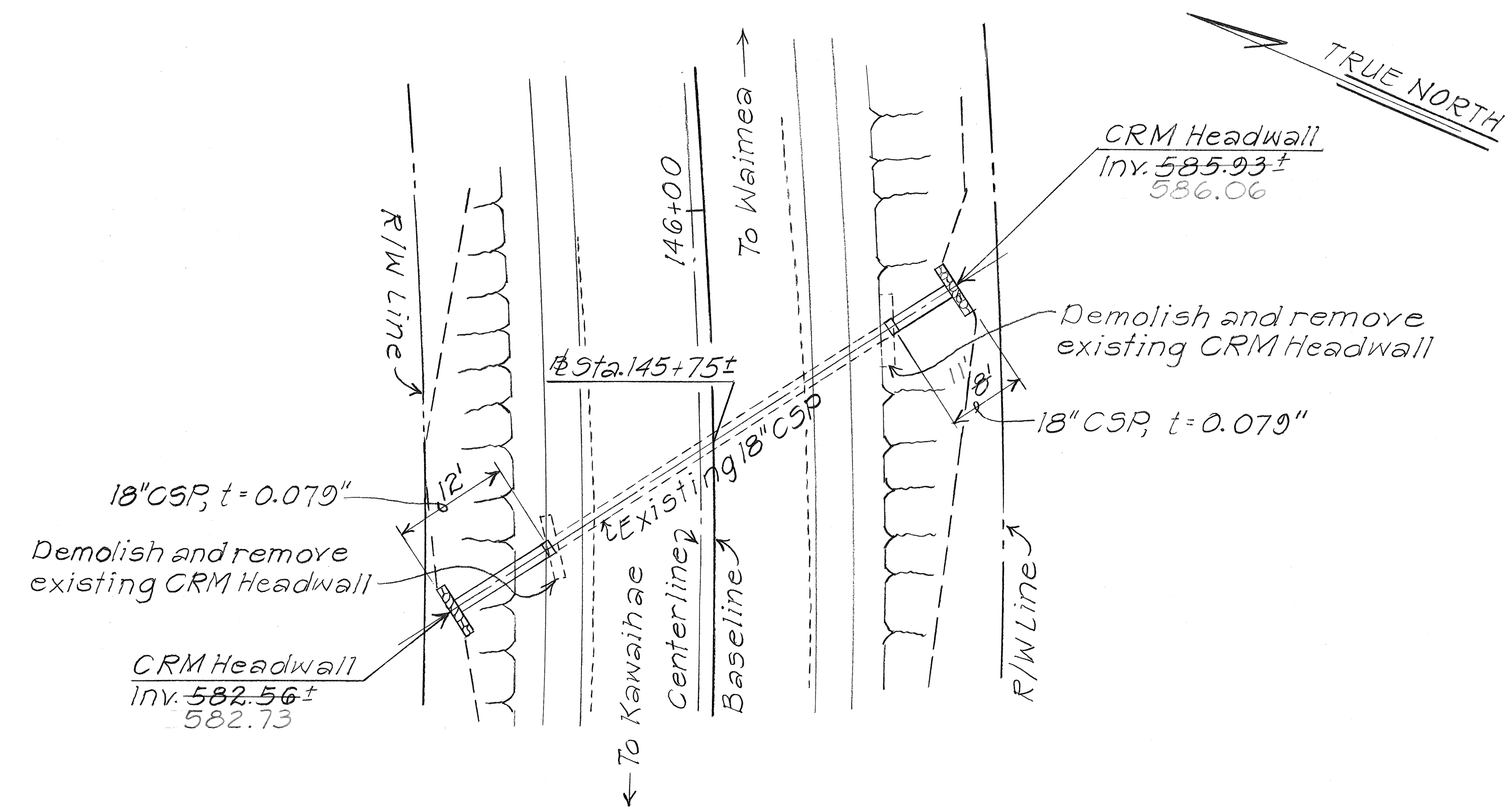
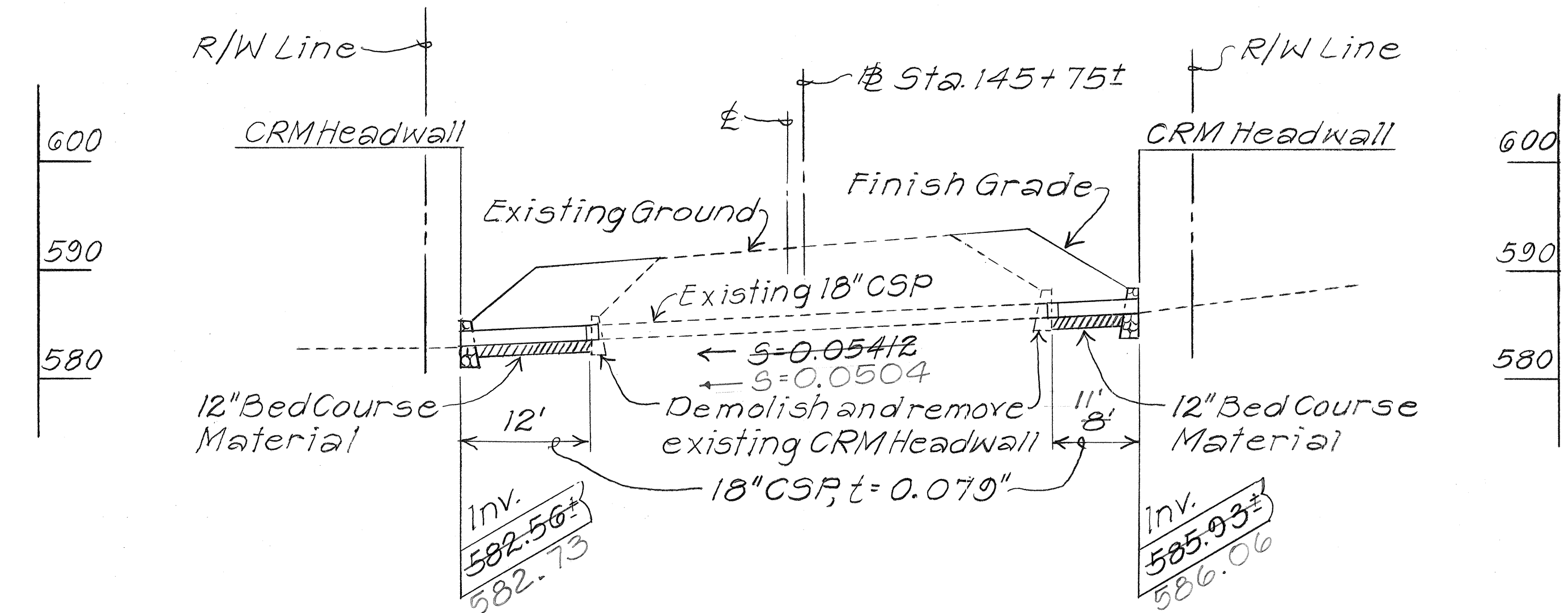


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HES-0100(28)	1986	10	67

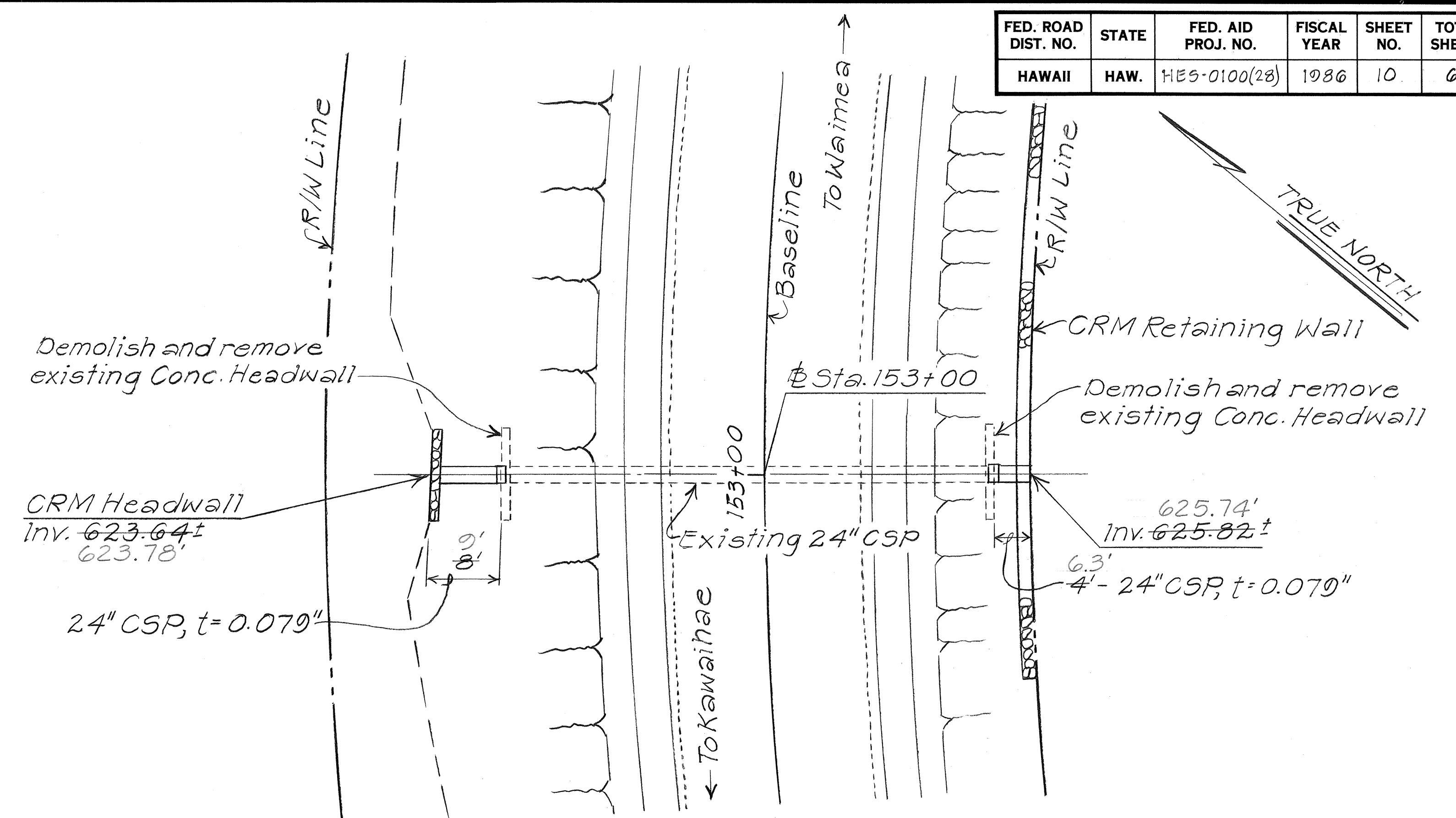


PLAN

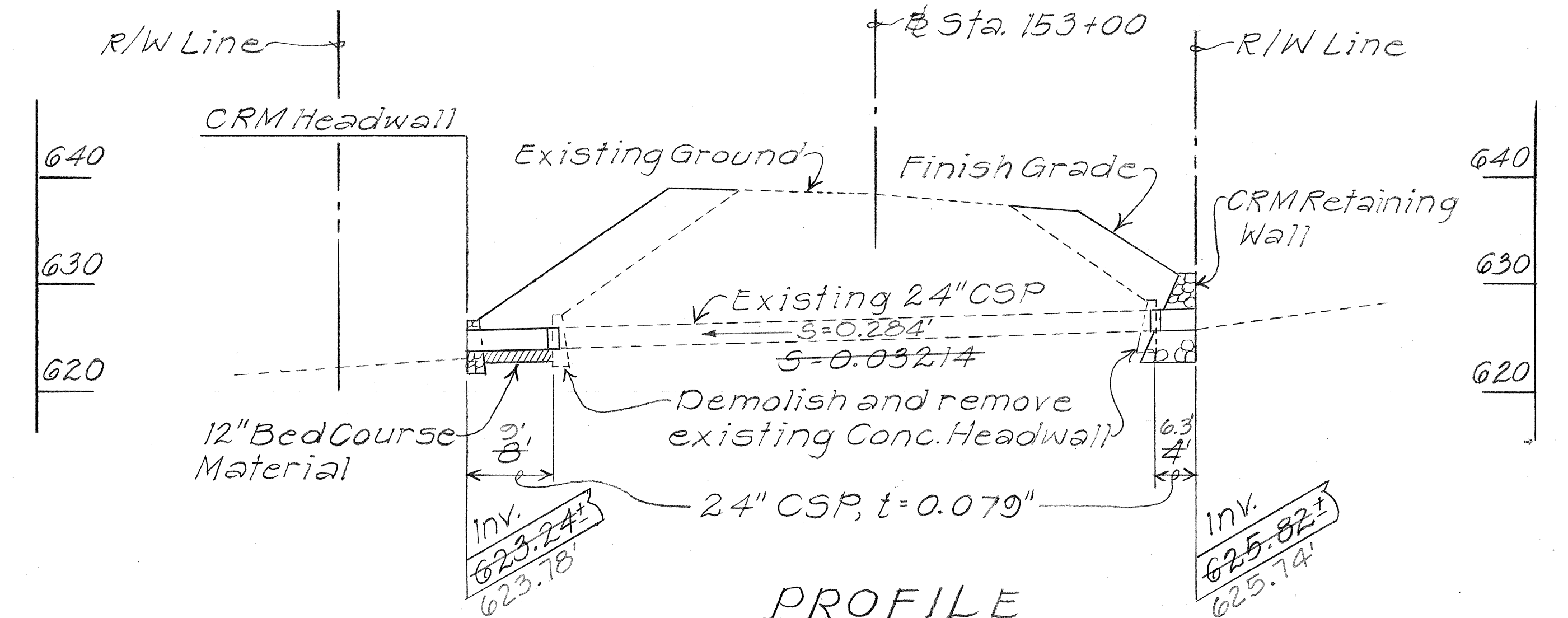


PROFILE

DETAIL OF 18" CULVERT AT STA. 145+75±



PLAN



PROFILE

DETAIL OF 24" CULVERT AT STA. 153+00

GENERAL NOTES:

Scale: 1" = 10'

- Existing drainage system will be functional at all times during construction. Contractor is to furnish materials, equipment, labor, tools and incidentals.
- Demolishing and removing a portion or the entire existing structure shall not be paid for separately but shall be considered incidental to the various contract items.
- Contractor shall verify the locations of all culverts in the field. Any culvert damaged during construction shall be repaired or replaced by the Contractor at his expense.

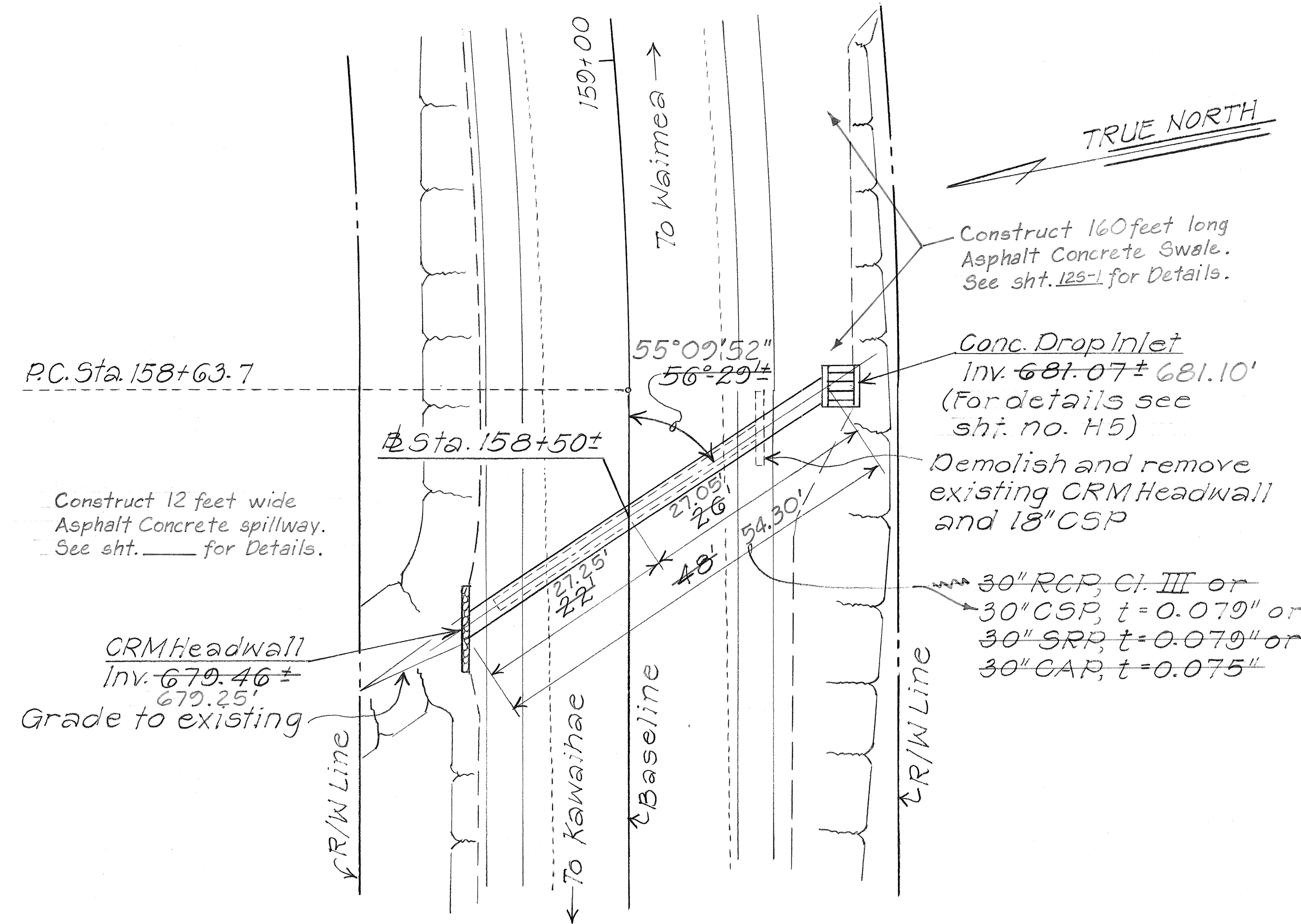
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

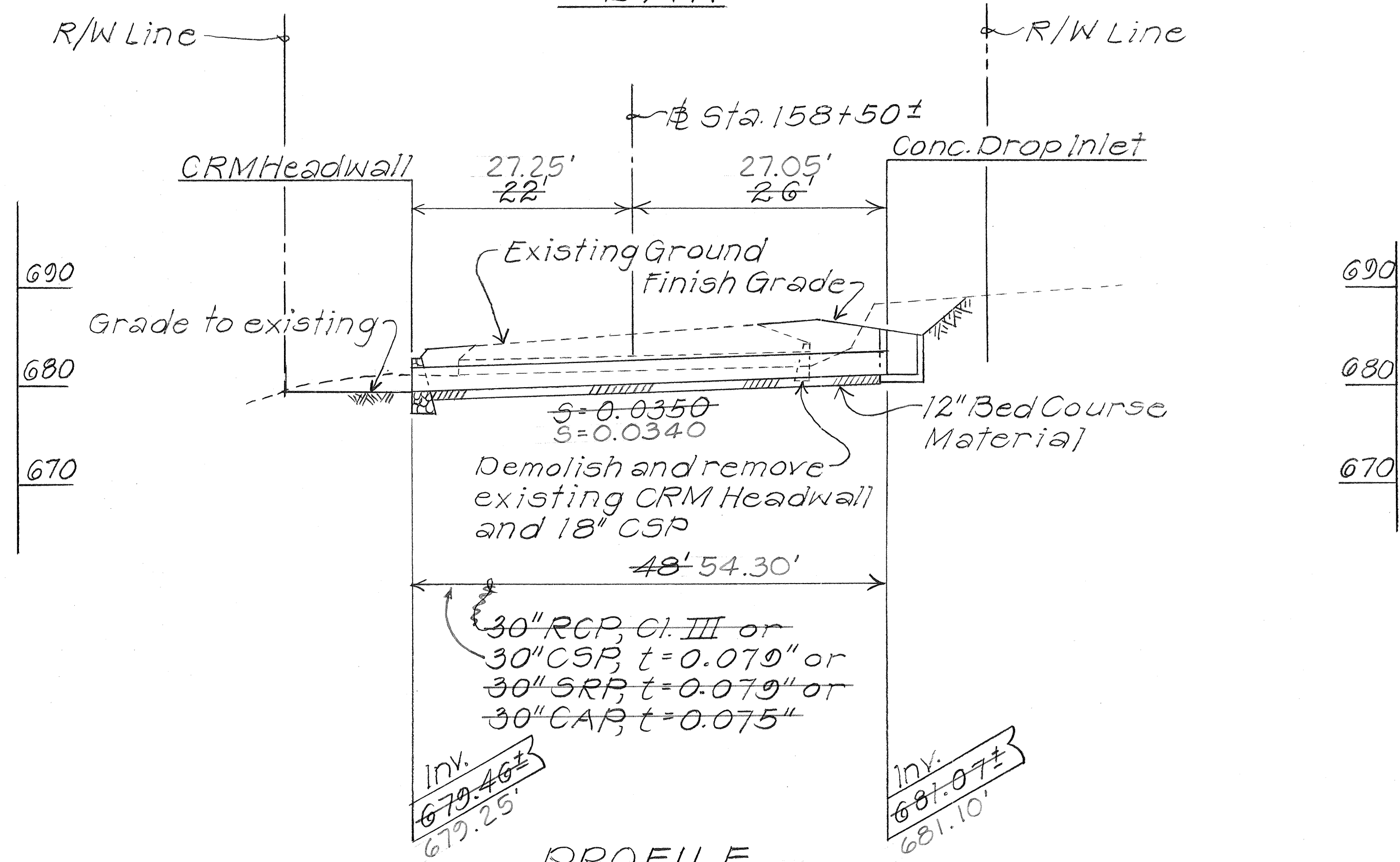
KAWAIIHAE ROAD SAFETY IMPROVEMENTS
PHASE II
Waimea To Kawaihae
F.A. PROJECT No. HES-0100(28)
Scale: As Noted Date: May, 1986
SHEET No. H1 OF 7 SHEETS

ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HES-0100(28)	1986	11	67

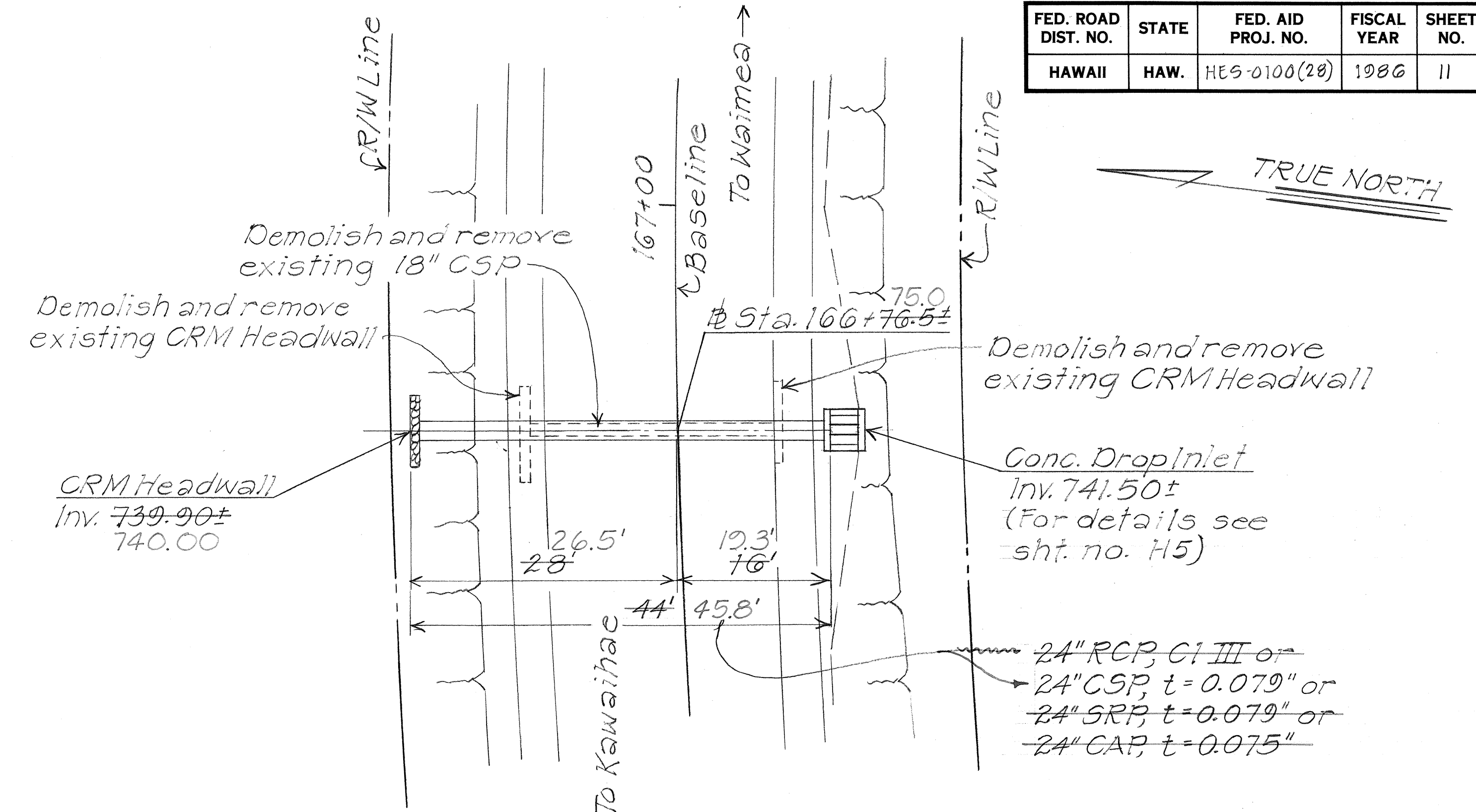


PLAN

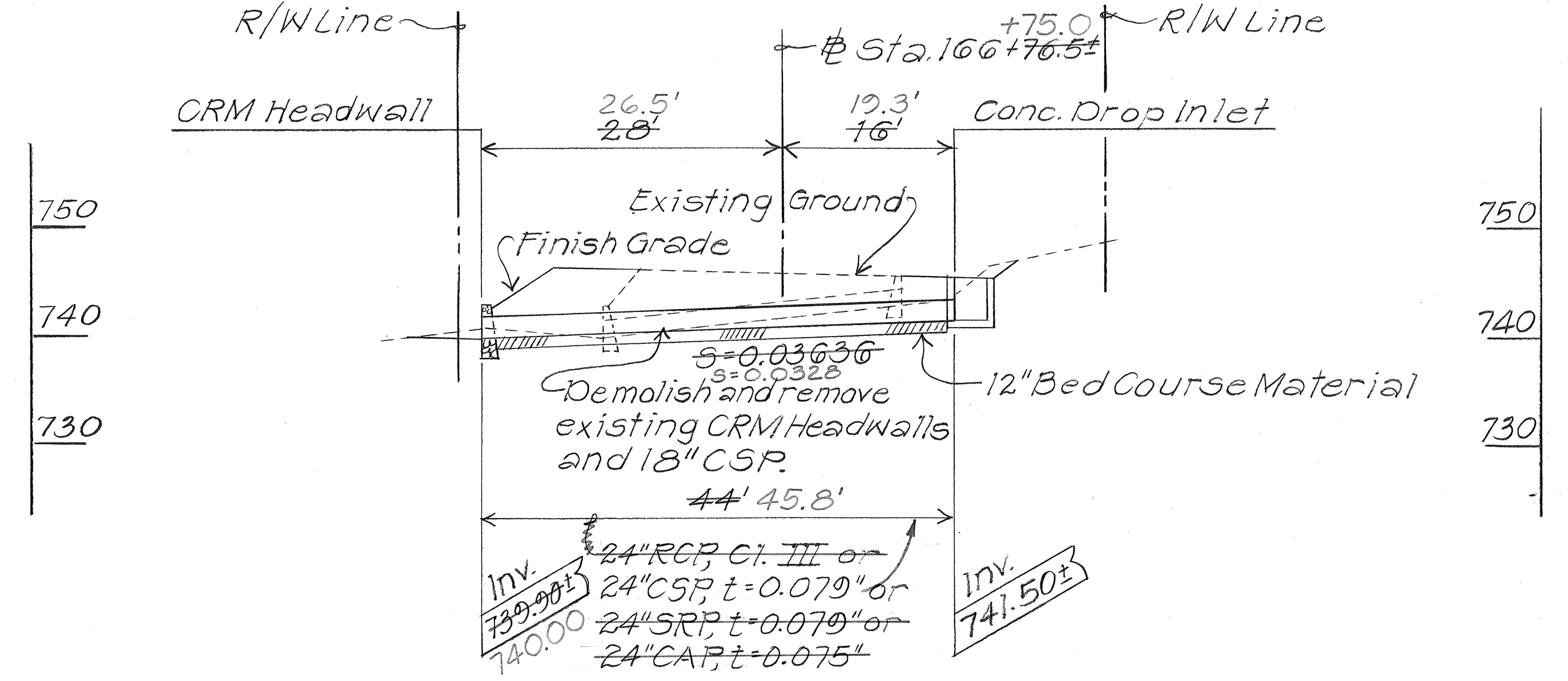


PROFILE

DETAIL OF 30" CULVERT AT STA. 158+50±
Scale: 1" = 10'



PLAN



PROFILE

DETAIL OF 24" CULVERT AT STA. 166+76.5±
Scale: 1" = 10'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NO.	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	CHECKED BY	

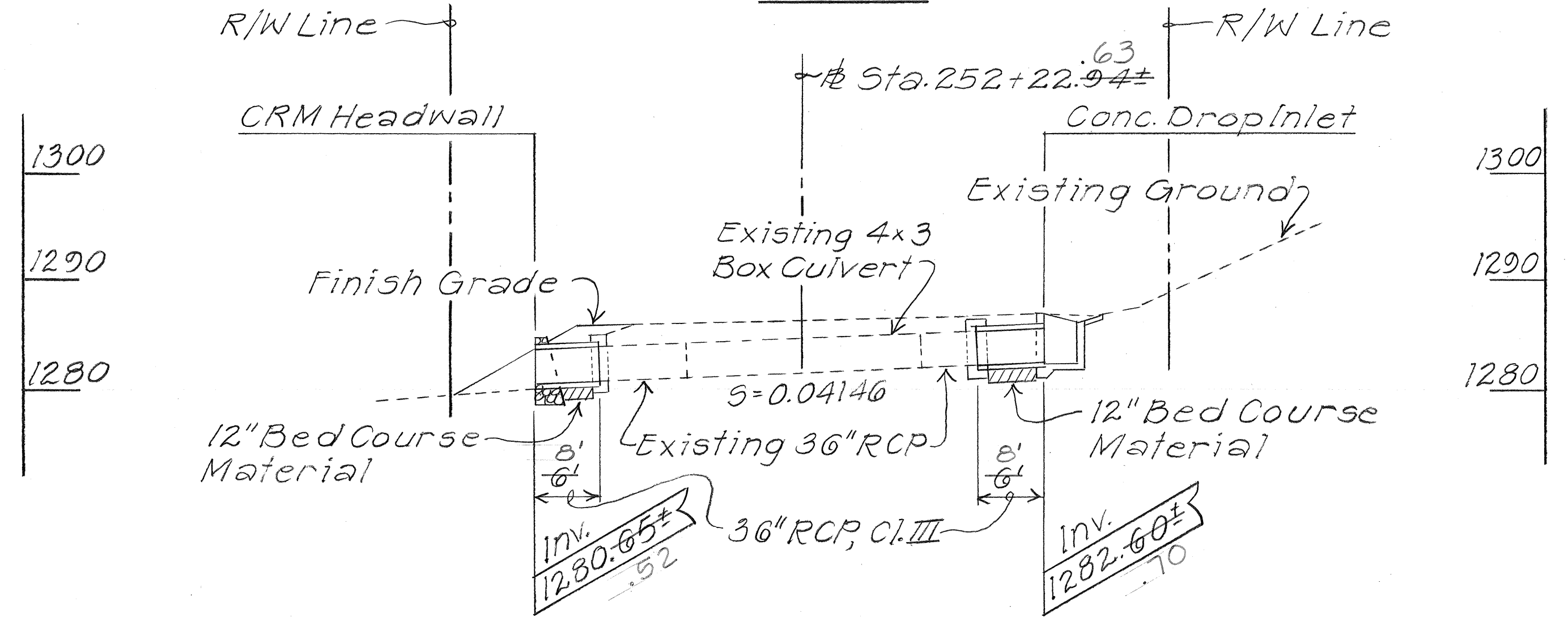
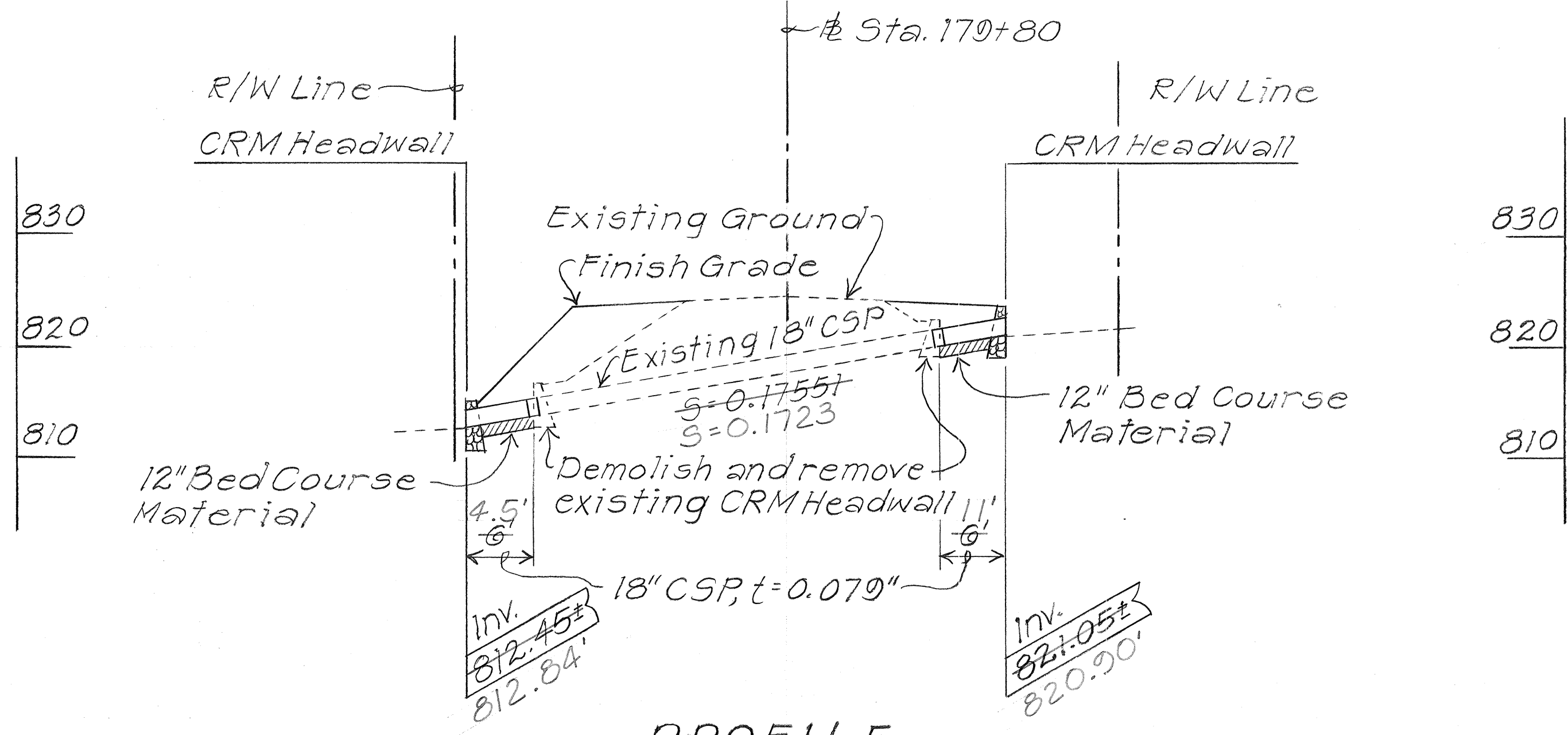
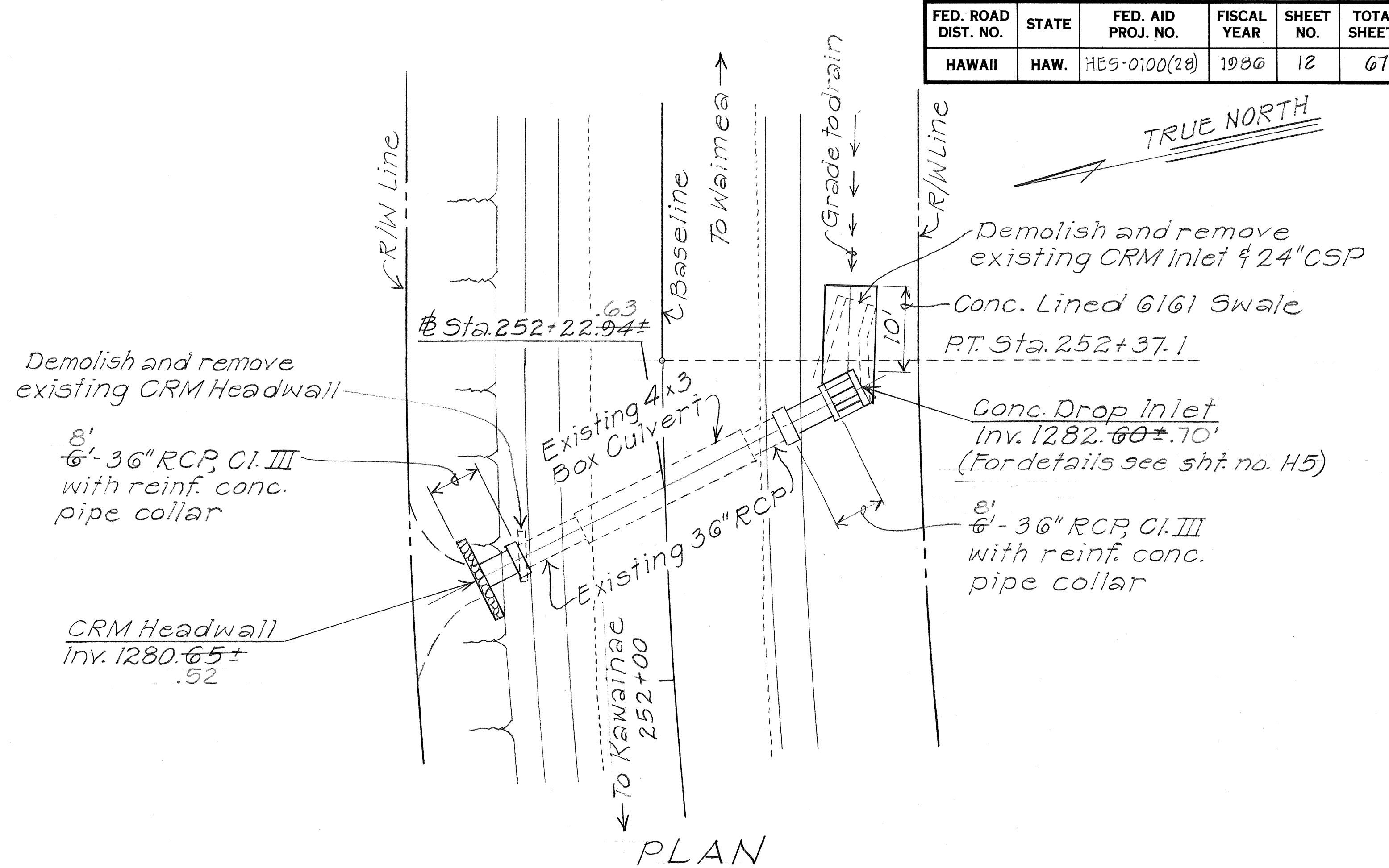
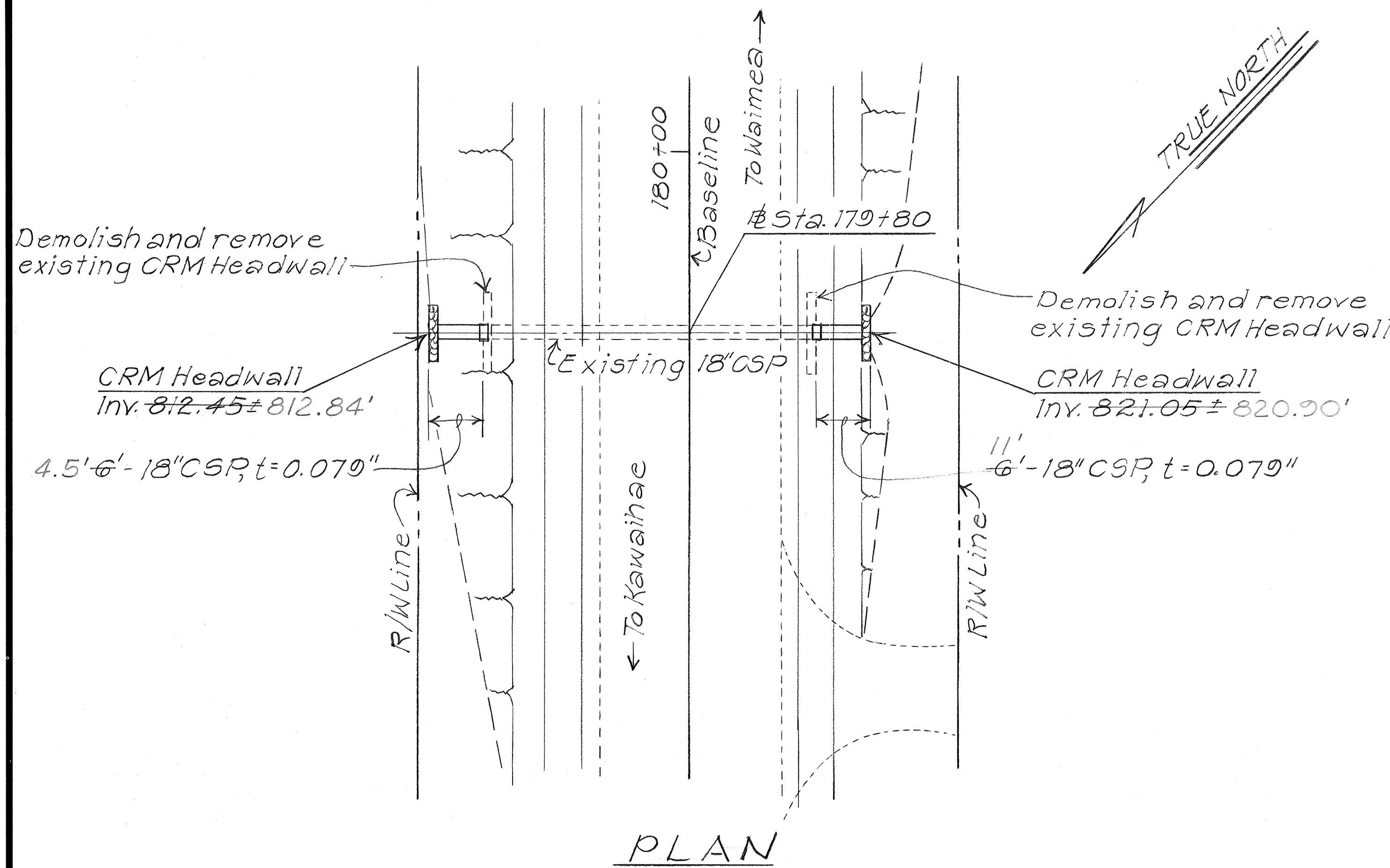
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

KAWAIIHAE ROAD SAFETY IMPROVEMENTS
PHASE II
Waimea To Kawaihae
P.A. PROJECT No. HES-0100(28)
Scale: As Noted Date: May, 1986

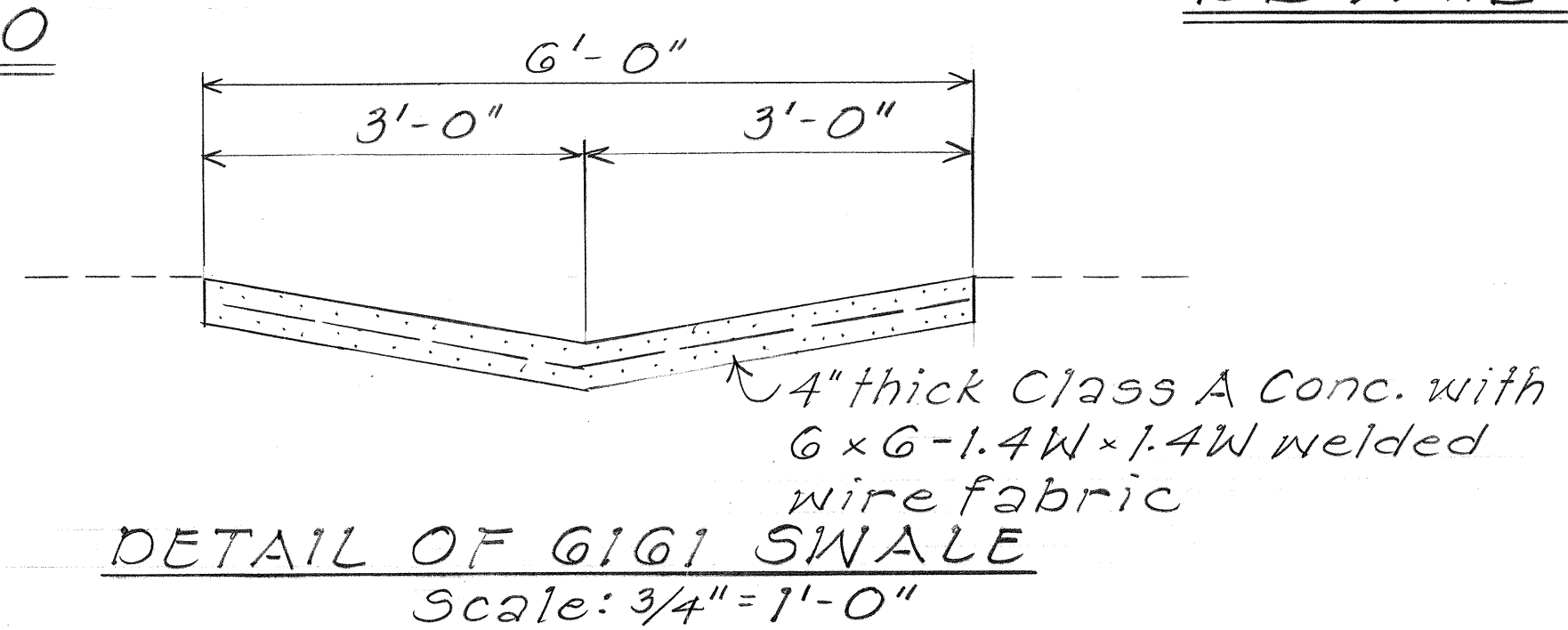
SHEET NO. H2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HES-0100(28)	1986	12	67



PROFILE
DETAIL OF 18" CULVERT AT STA. 179+80
 Scale: 1" = 10'

PROFILE
DETAIL OF 36" CULVERT AT STA. 252+22.94
 Scale: 1" = 10'



DETAIL OF 6x6 SWALE
 Scale: 3/4" = 1'-0"

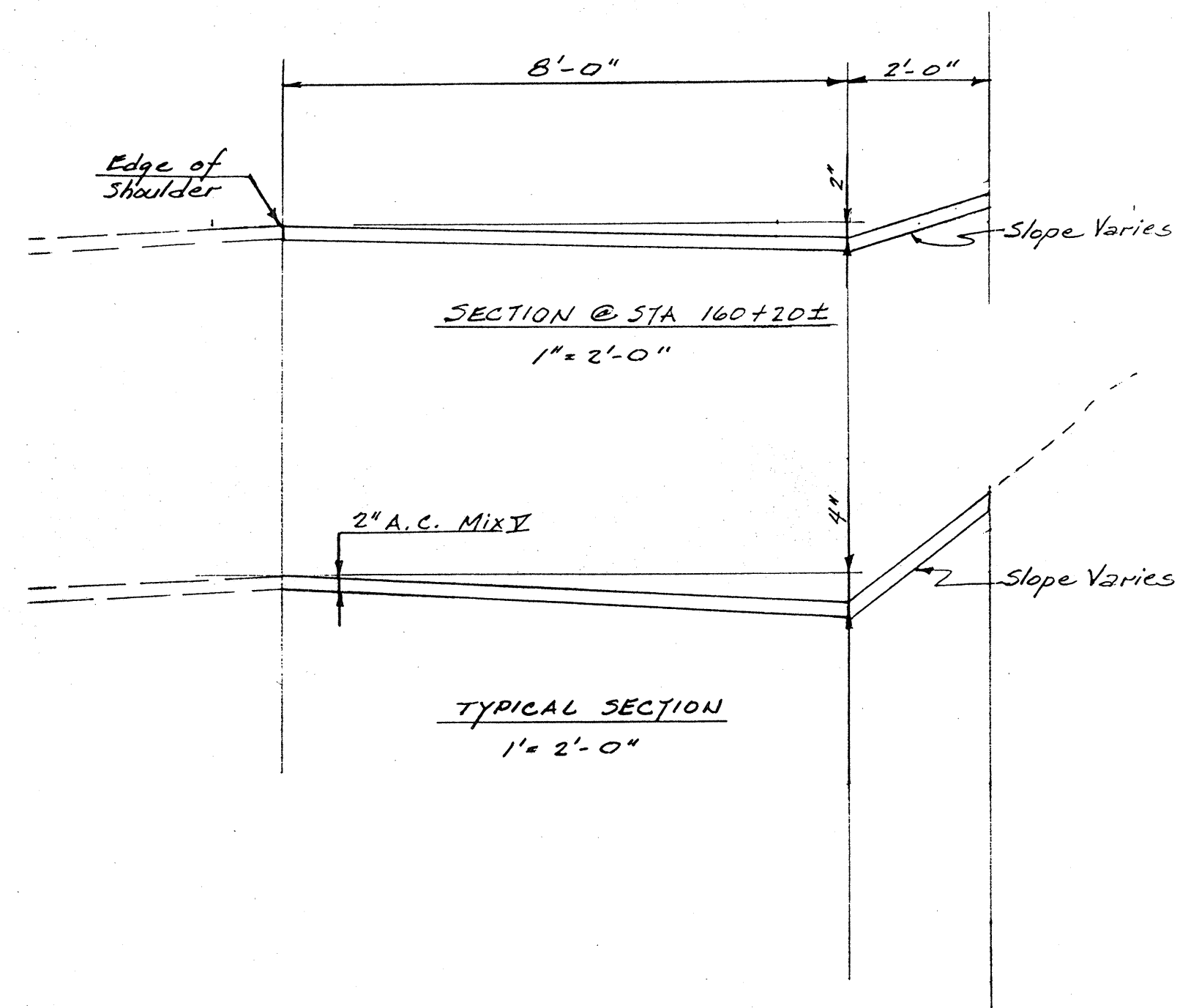
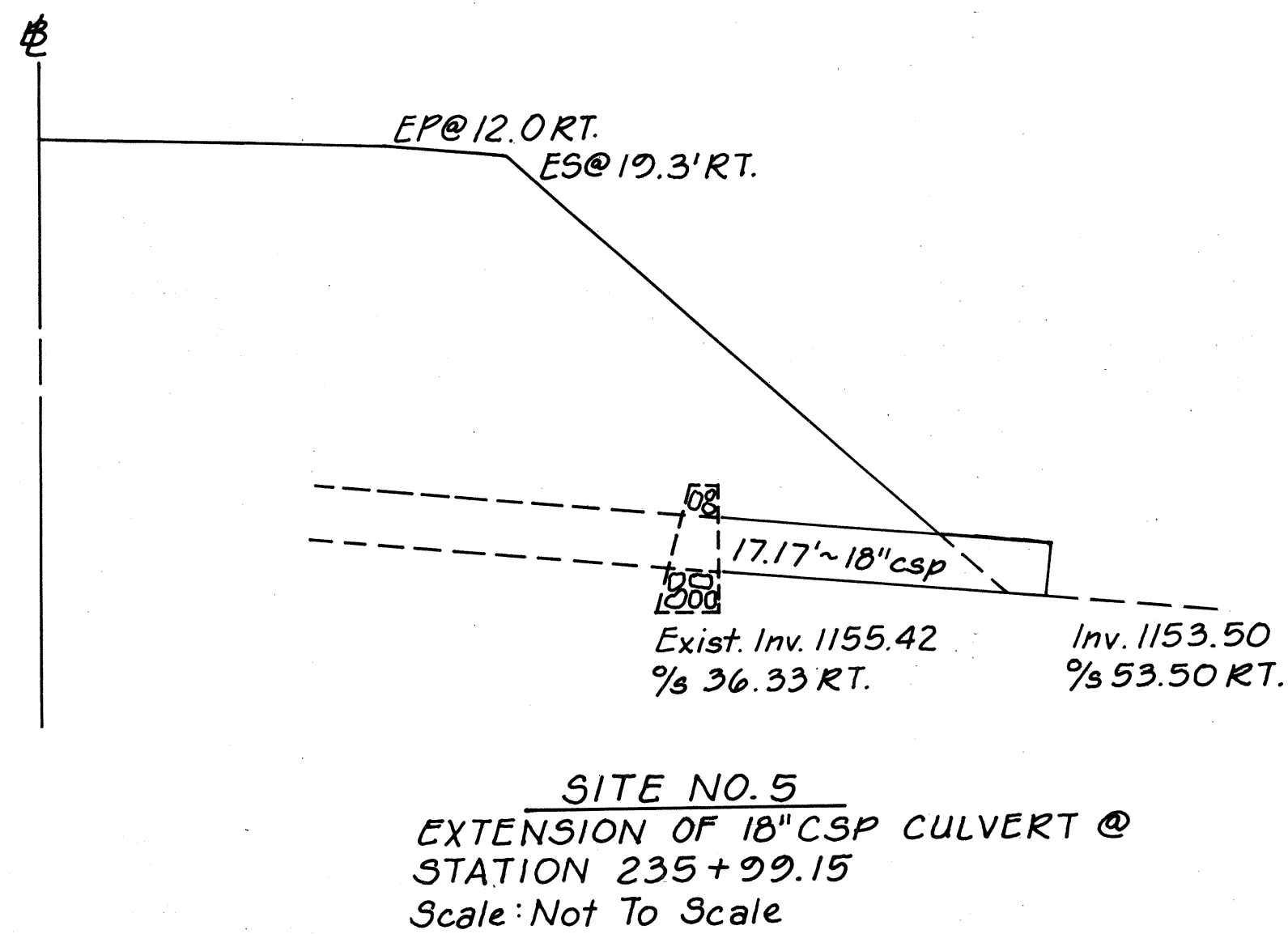
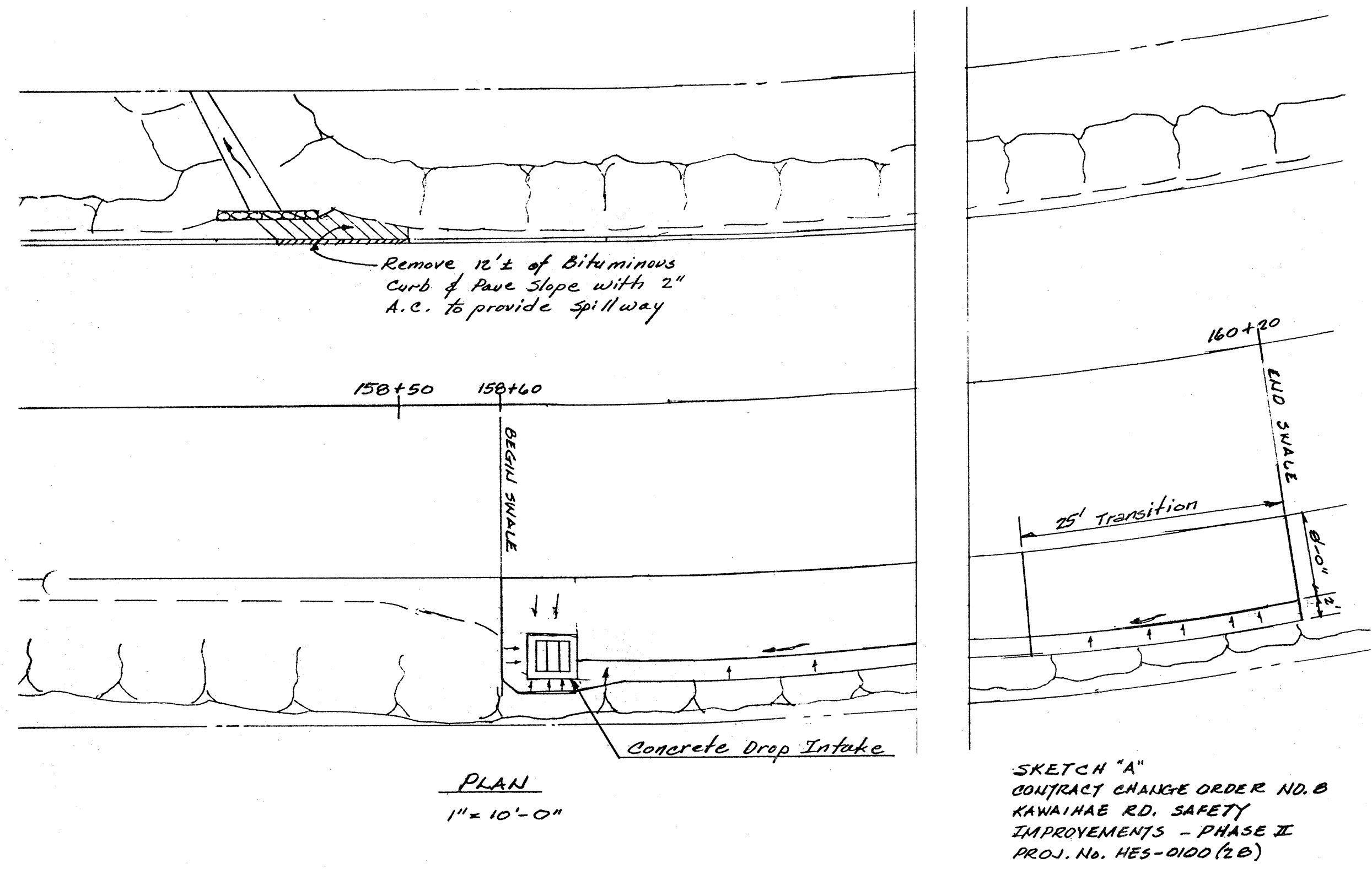
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

DRAINAGE PLAN

KAWAIIHAE ROAD SAFETY IMPROVEMENTS
 PHASE II
 Waimea To Kawaihae
 F.A. PROJECT No. HES-0100(28)
 Scale: As Noted Date: May, 1986
 SHEET No. H3 OF 7 SHEETS

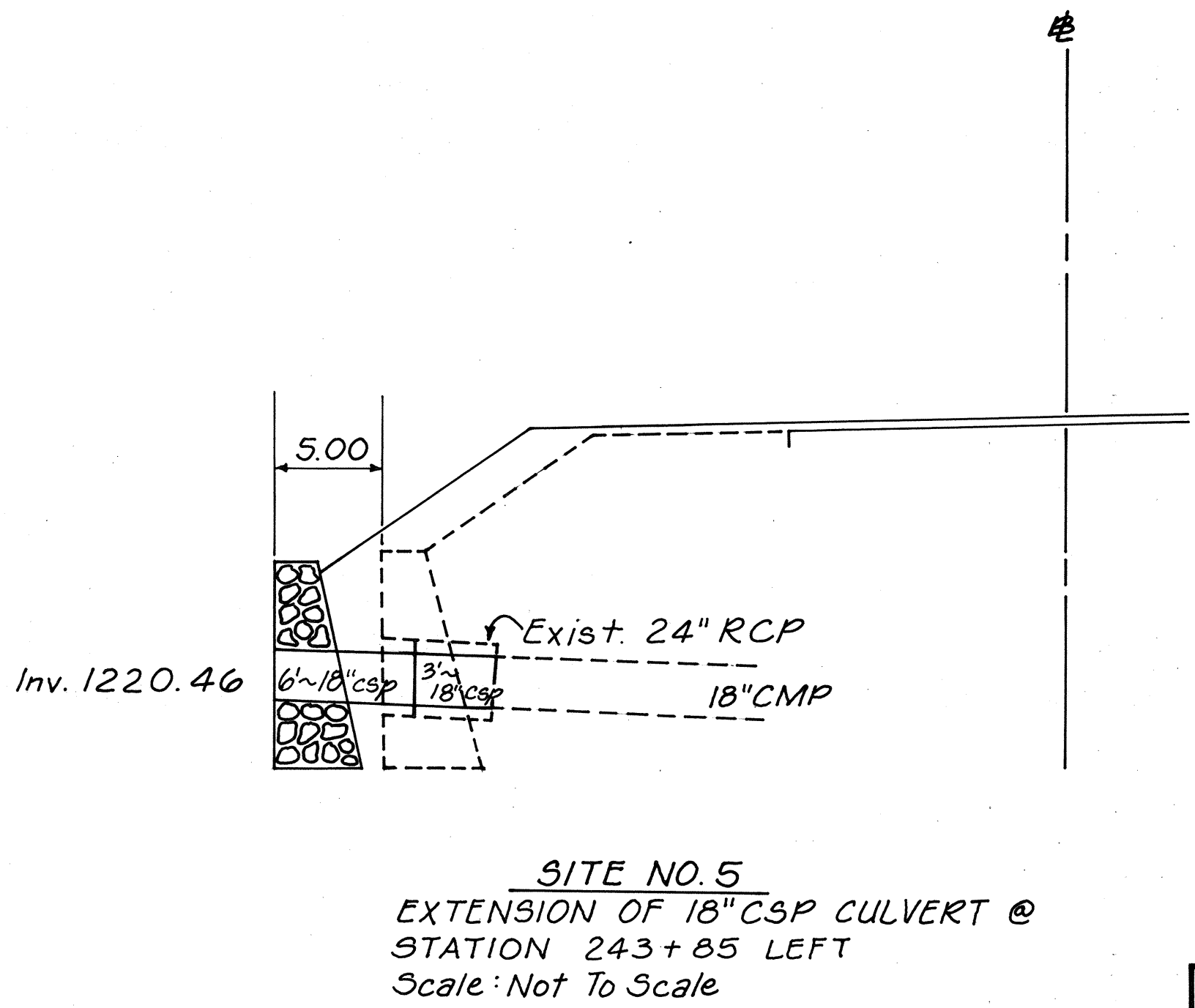
ORIGINAL PLAN	DAVE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
DATE	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HES-0100(28)	1986	125-1	67



- NOTES:
- 1) Contractor to grade and compact sub grade before paving 2" thick A.C. swale
 - 2) Provide 25' transition Sta 160+05 to 160+20±.

SKETCH "B"
CONTRACT CHANGE ORDER NO. 8
KAWAIHAE RD. SAFETY
IMPROVEMENTS - PHASE II
PROJ. NO. HES-0100 (28)



Note: This tracing prepared during "As-Built" posting.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN

KAWAIHAE ROAD SAFETY IMPROVEMENTS
PHASE II
WAIMEA TO KAWAIHAE
F.A. PROJ. NO. HES-0100(28)
Scale: As Shown Date: Oct., 1987

SHEET NO. / OF / SHEETS

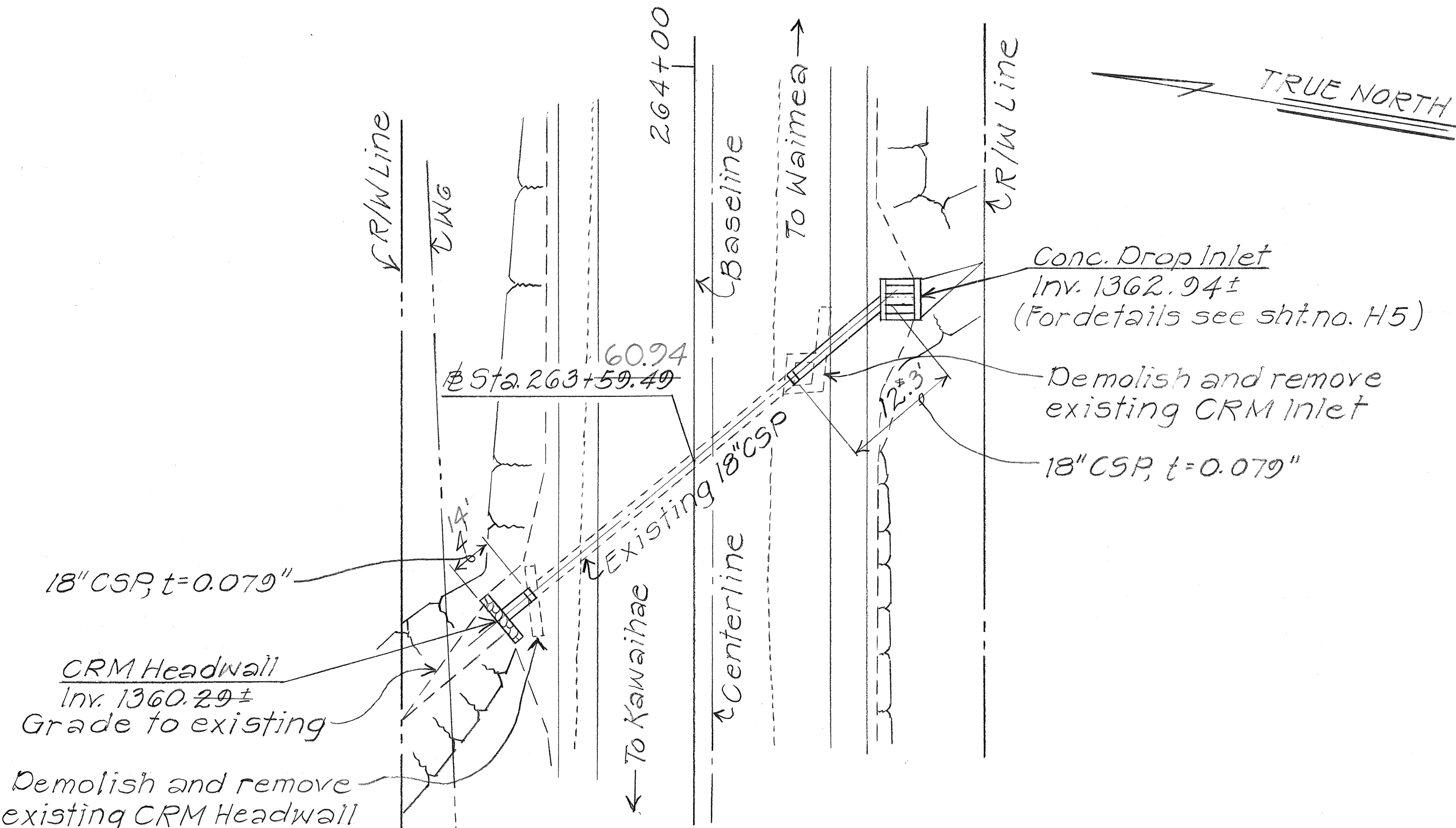
SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HES-0100(28)	1986	13	67

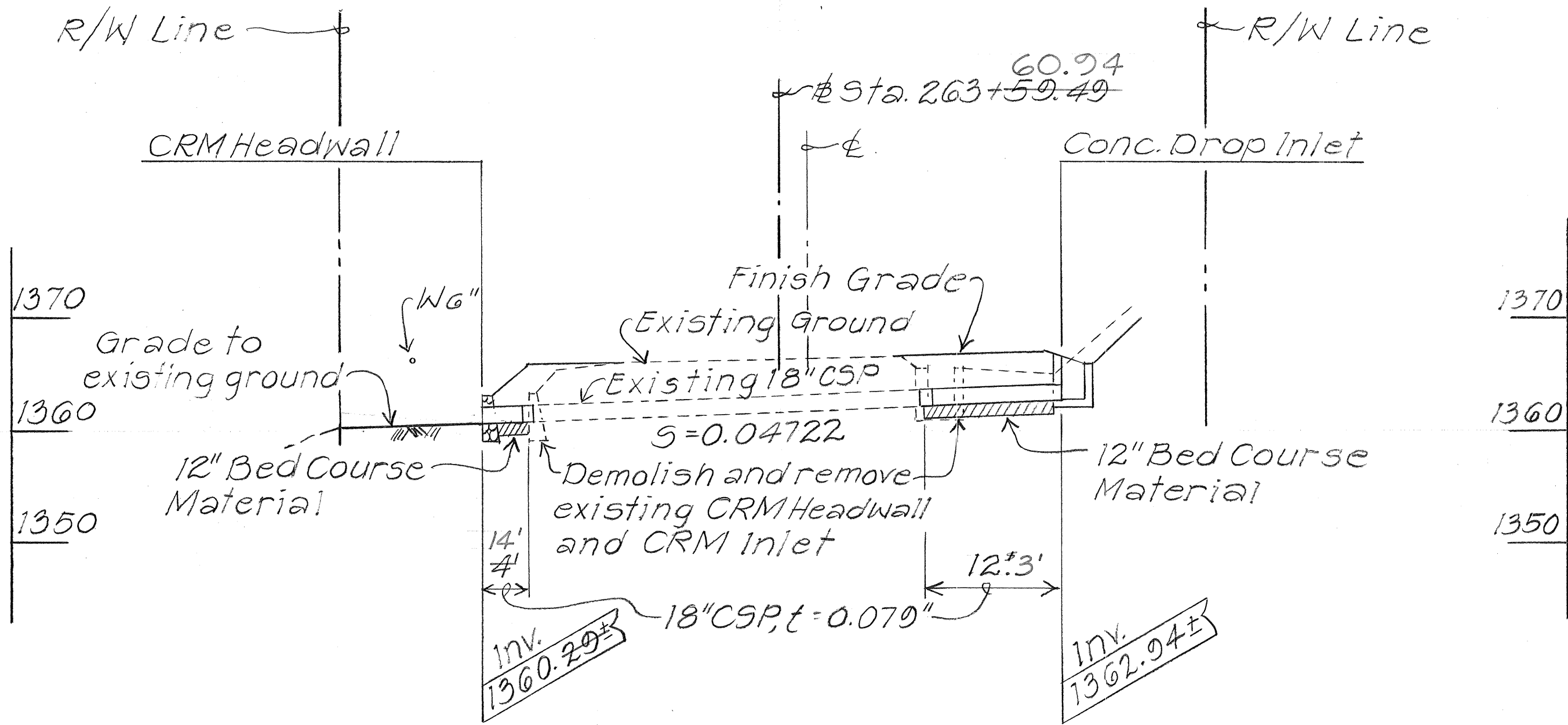
* In the event of plan alterations causing increase or decrease to the quantity of specified lump sum work, the following estimated quantities shall be used to determine theoretical unit price as defined in subsection 104.02 (B) lump sum items:

*Lump Sum Items in Proposal

ITEM NO.		206	207	503	602	603	508	603	603	603	603	603	604
UNIT USED		1001	0100	0011	1001	0011	0100	1014	2062	2066	7803	7805	2370
STRUCTURE	STATION	(CY)	(CY)	(CY)	(LB)	(CY)	CY	LF	LF	LF	LF	LF	EA
		Structure Excavation other than at Bridges	Ditch and Channel Excavation	Class A Concrete other than in Bridges	Reinforcing Steel other than in Bridges	Bed Course Material for Culvert	Cement Rubble Masonry	36-Inch Reinforced Concrete Pipe, Class III	18-Inch Corrugated Steel Pipe, Sht. "t" 0.079 inch	24-Inch Corrugated Steel Pipe, Sht. "t" 0.079 inch	24-Inch RCP, Cl. III, or 24-Inch CSP, Sht. "t" 0.079" or 24-Inch SRP, Sht. "t" 0.075" or 24-Inch CAP, Sht. "t" 0.075"	30-Inch RCP, Cl. III, or 30-Inch CSP, Sht. "t" 0.079" or 30-Inch SRP, Sht. "t" 0.079" or 30-Inch CAP, Sht. "t" 0.075"	Single 3 1/2 inch Diameter Pipe Grate
CRM Headwall	145+75 Lt.	11.9				1.3	1.3		12				
CRM Headwall	145+75 Rt.	7.9				0.8	1.3		11'8"				
CRM Headwall	153+00 Lt.	9.9					2.1		11'8"				
Inlet	153+00 Rt.	-				-	-		6'5" #4				
CRM Headwall	158+50 Lt.	7.3	1.1				4.3 3.0					24	
CDI	158+50 Rt.	44.7		2.0	170	6.7						32 #8	3 2
CRM Headwall	166+76.5 Lt.	5.3					2.1				20		
CDI	166+76.5 Rt.	37.2		1.9	170	6.3					25.8' #4		2
CRM Headwall	179+80 Lt.	5.9				0.6	1.3		4'5" 6"				
CRM Headwall	179+80 Rt.	5.5				0.6	1.3		13' 6"				
CRM Headwall	252+22.54 Lt.	12.9		2.4	130	0.6	4.1	8'6"					
CDI	252+22.54 Rt.	15.5		8.2	400	0.9		8'6"					3-2
CRM Headwall	263+59.49 Lt.	4.9	1.5			0.3	1.4		4				
CDI	263+59.49 Rt.	14.9		2.3	180	1.5			12.3'				2-2
TOTAL		183.8	2.6	16.8	1,050	19.6	17.8	12	48	12	44	48	8
CRM Headwall	243+85 Lt.						1.3		9				
Outlet	236+00 Rt.								16				
TOTAL		183.8	2.6	16.8	1,050	19.6	20.5	16	92.8	17.5	45.8	56	10



PLAN



PROFILE

DETAIL OF 18" CULVERT AT STA. 263+59.49 60.94
Scale: 1" = 10'

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

DRAINAGE PLAN

KAWAIHAE ROAD SAFETY IMPROVEMENTS

PHASE II

Waimea To Kawaihae

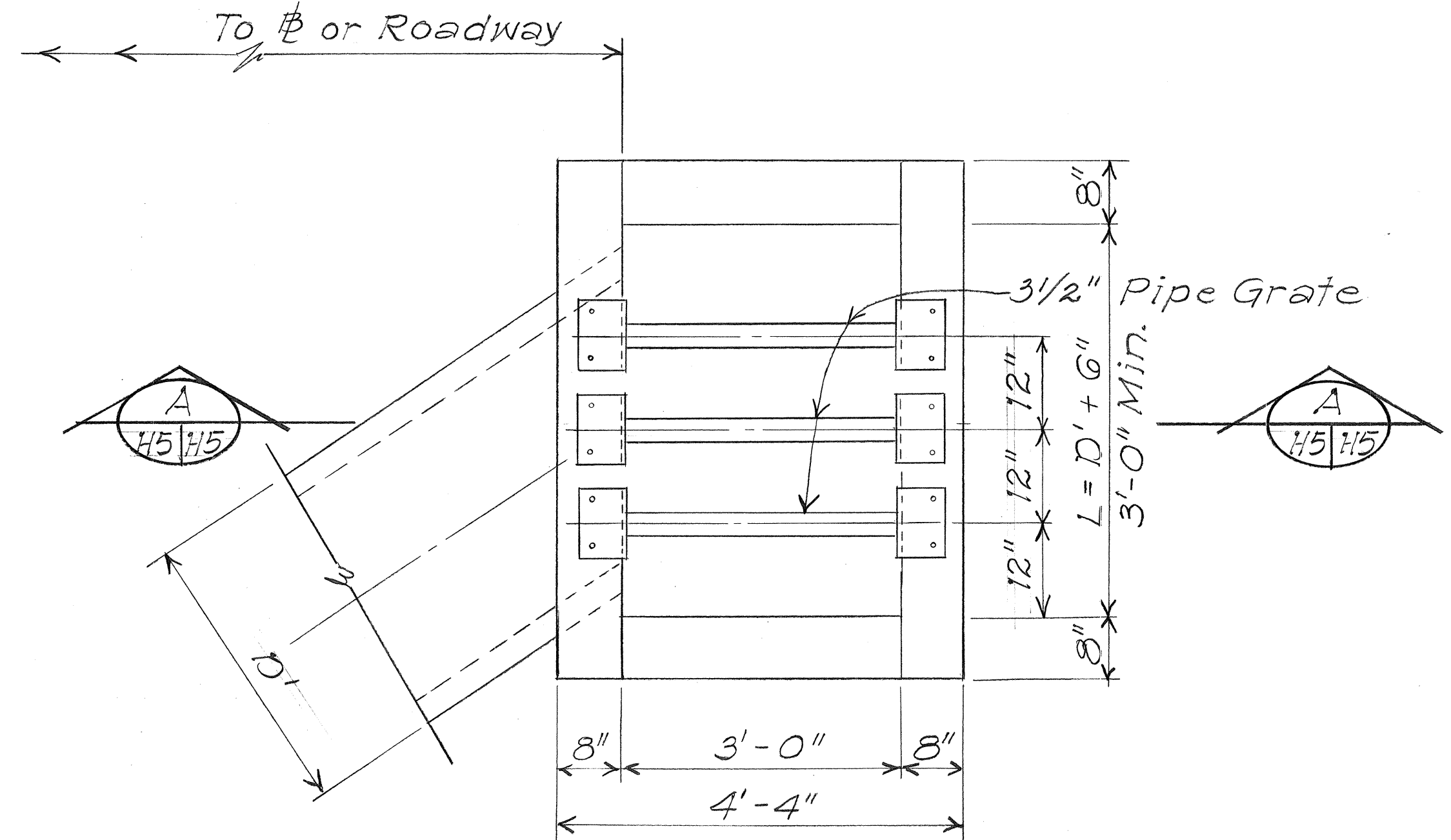
P.A. PROJECT No. HES-0100(28)

Scale: As Noted Date: May, 1986

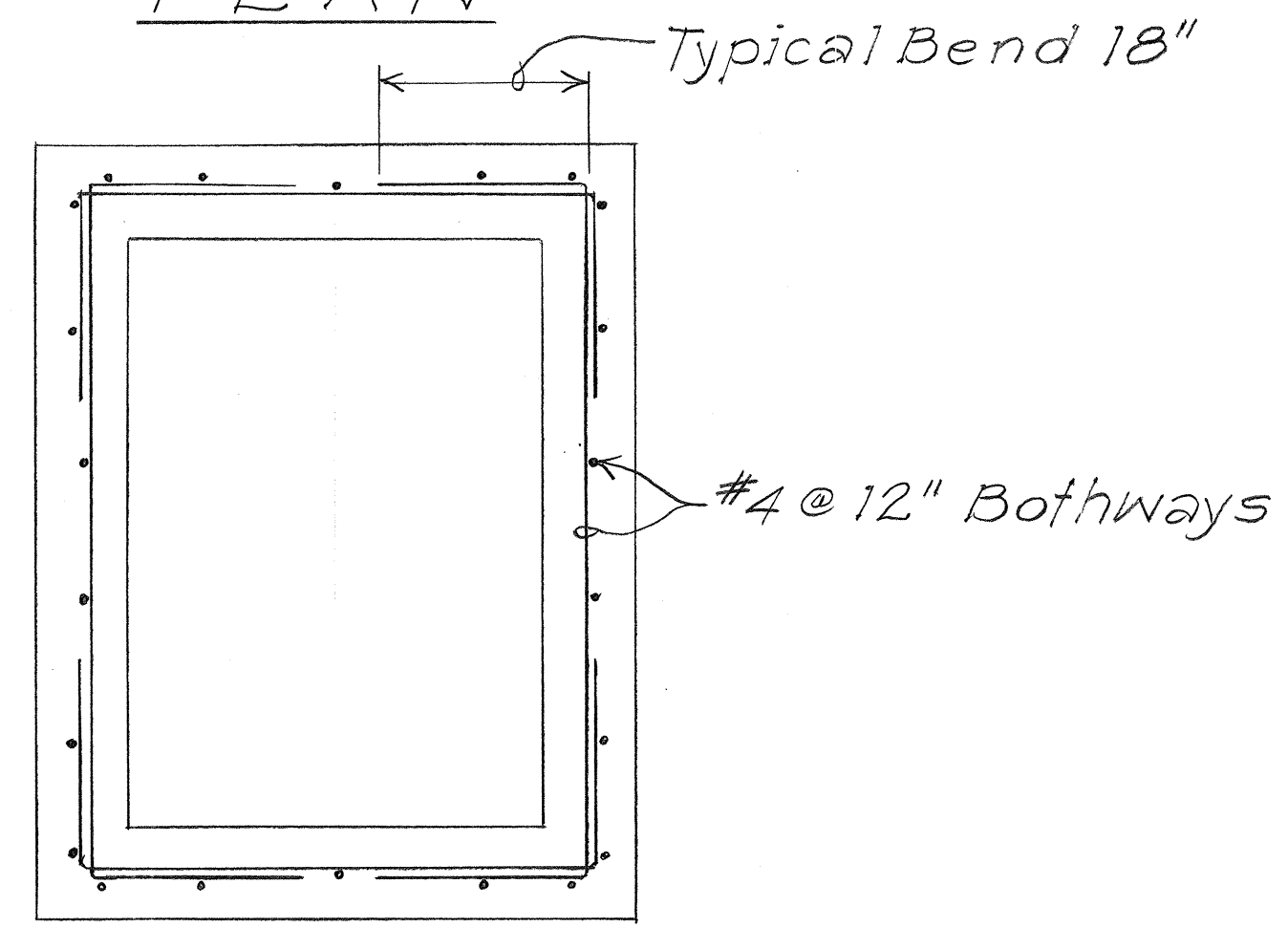
SHEET NO. H4 OF 7 SHEETS

13

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HE5-0100(28)	1986	14	67



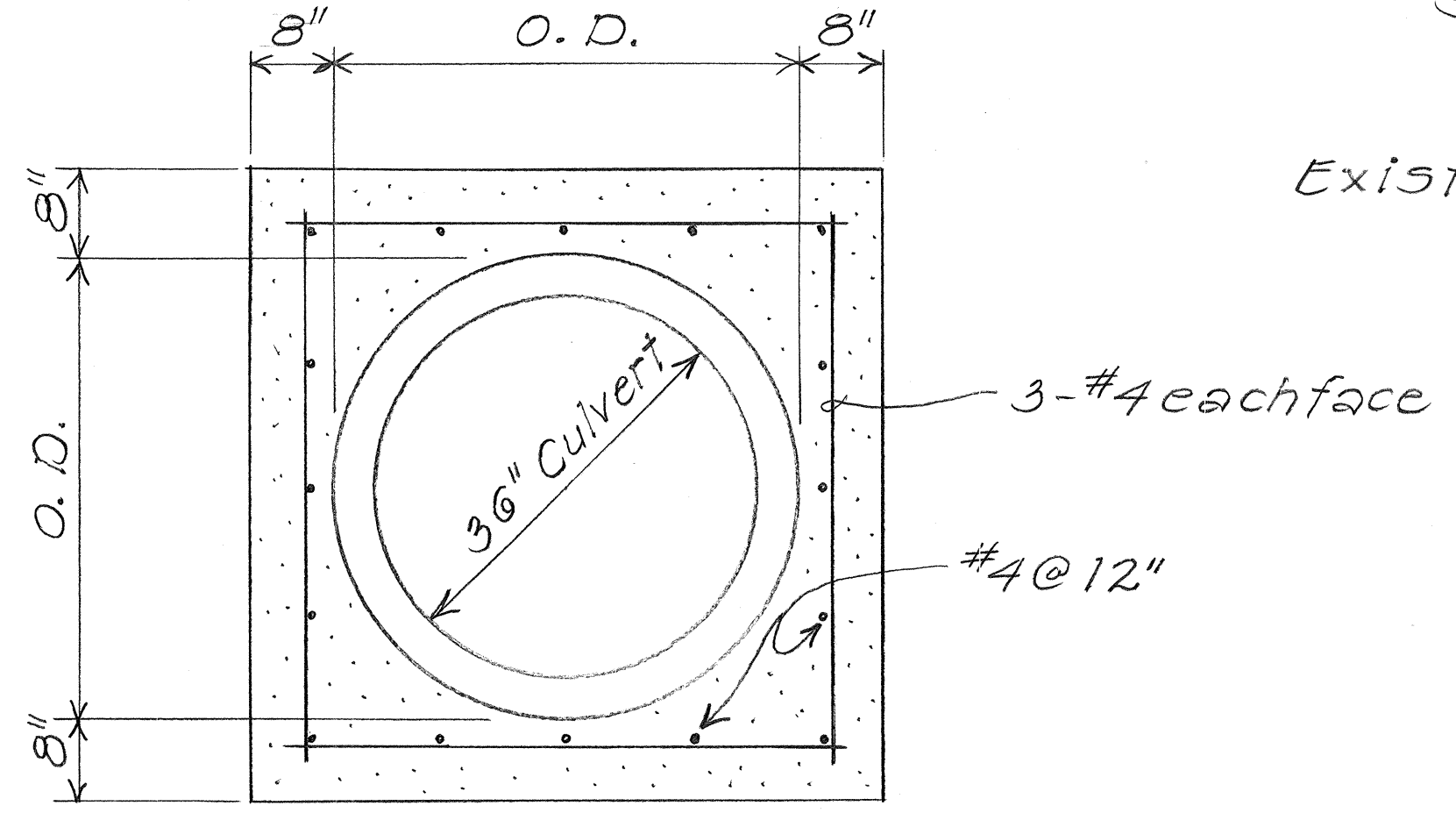
PLAN



PLAN VIEW OF REINF. STEEL

DETAIL OF CONCRETE DROP INLET

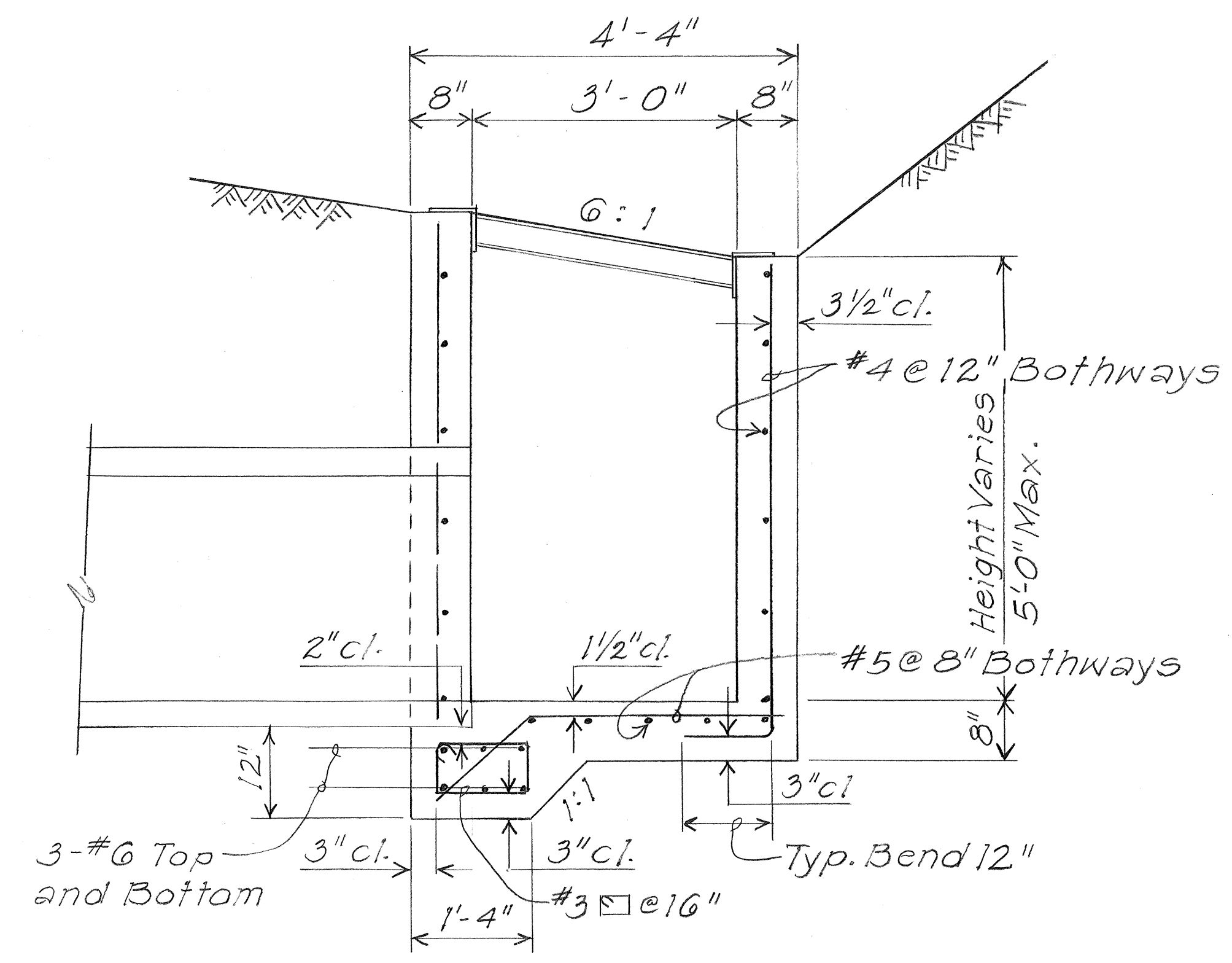
Scale: 3/4" = 1'-0"



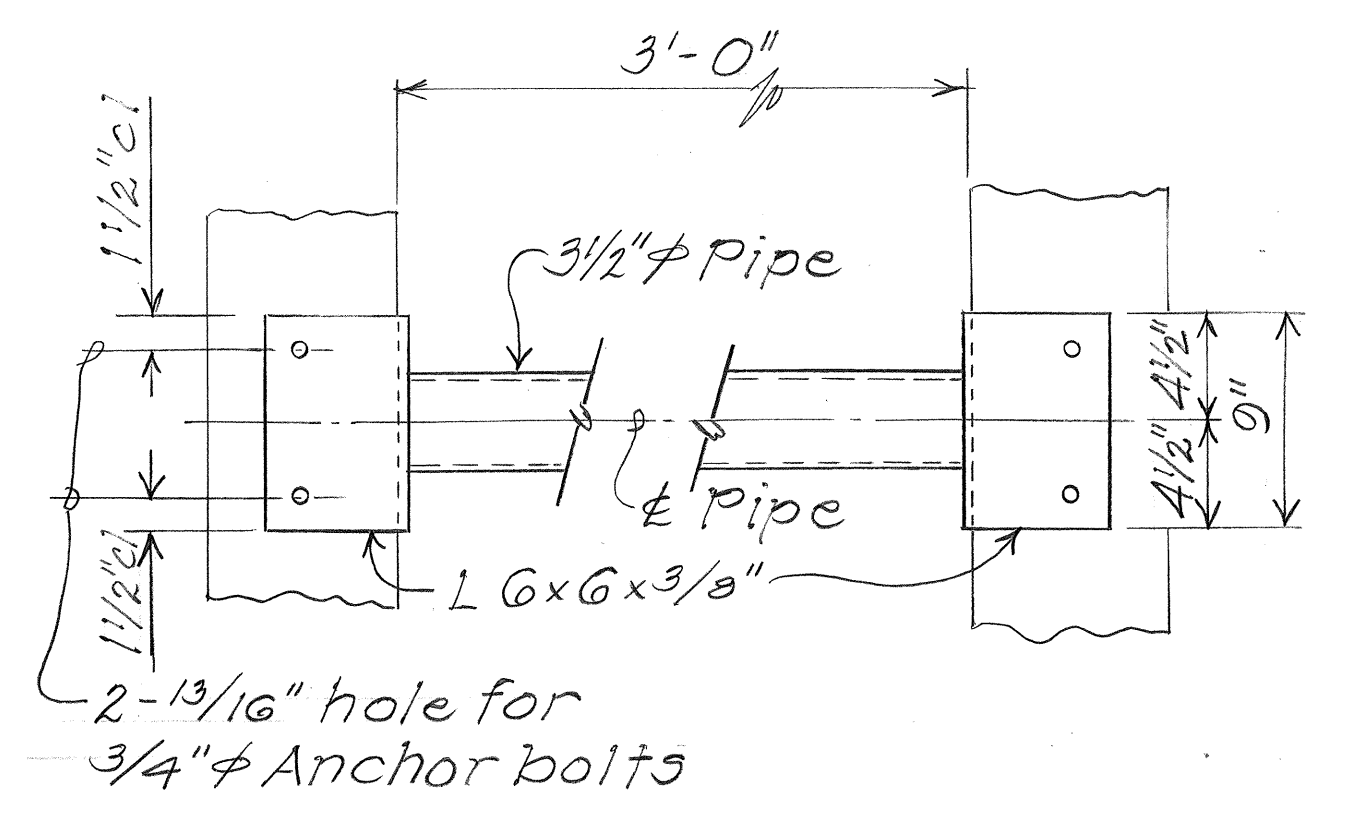
ELEVATION

DETAIL OF REINF. CONC. PIPE COLLAR

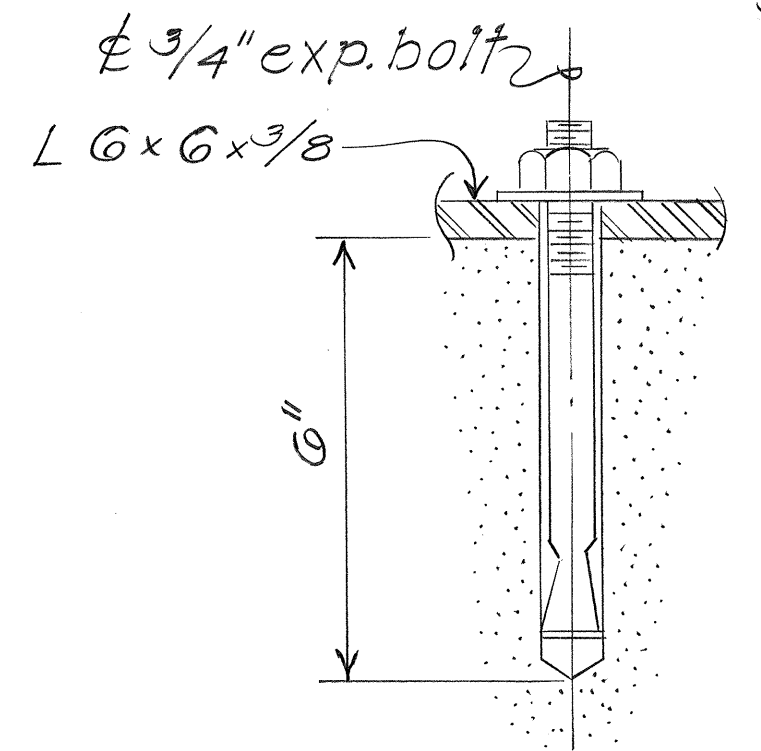
Scale: 3/4" = 1'-0"



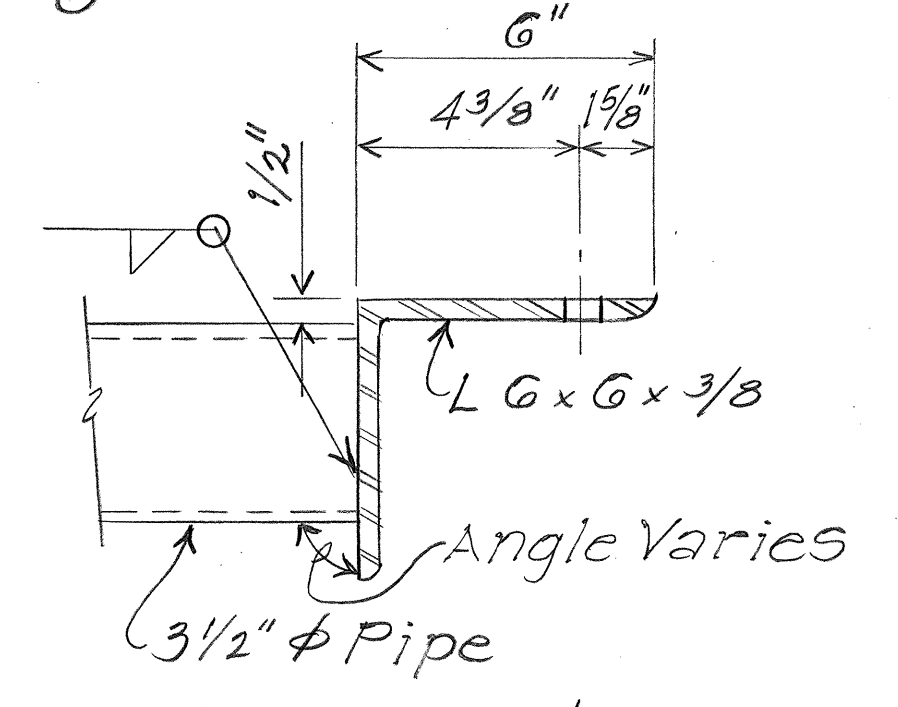
SECTION A



PLAN
Scale: 1 1/2" = 1'-0"



ANCHOR BOLT DETAIL
Not to Scale

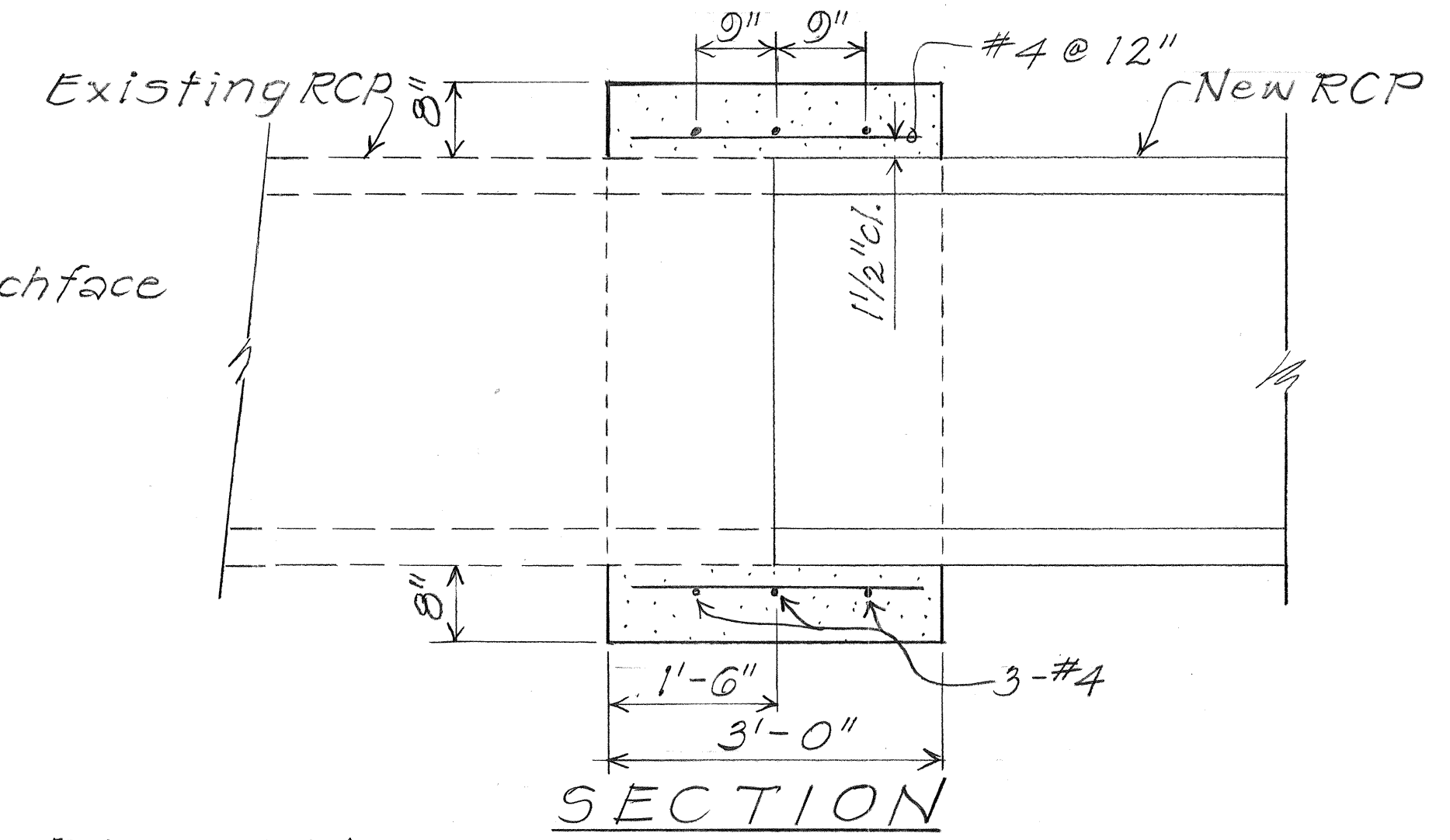


SECTION
Scale: 3" = 1'-0"

GENERAL NOTES:

1. Structural steel shapes and plates shall conform to ASTM A-36.
2. Structural pipe shall conform to ASTM A-53 Grade B.
3. Electrodes shall be E60XX, and welds shall be 3/16" fillet welds unless noted otherwise.
4. All dimensions shall be verified by the Contractor before fabrication and any discrepancy shall be promptly reported to the Engineer.
5. All structural steel assemblies and hardware shall be hot dip galvanized after fabrication.
6. No percussion or impact drills shall be permitted in drilling holes in the structure.
7. Expansion bolts shall be considered incidental to the various contract items.

DETAIL OF 3 1/2" PIPE GRATE



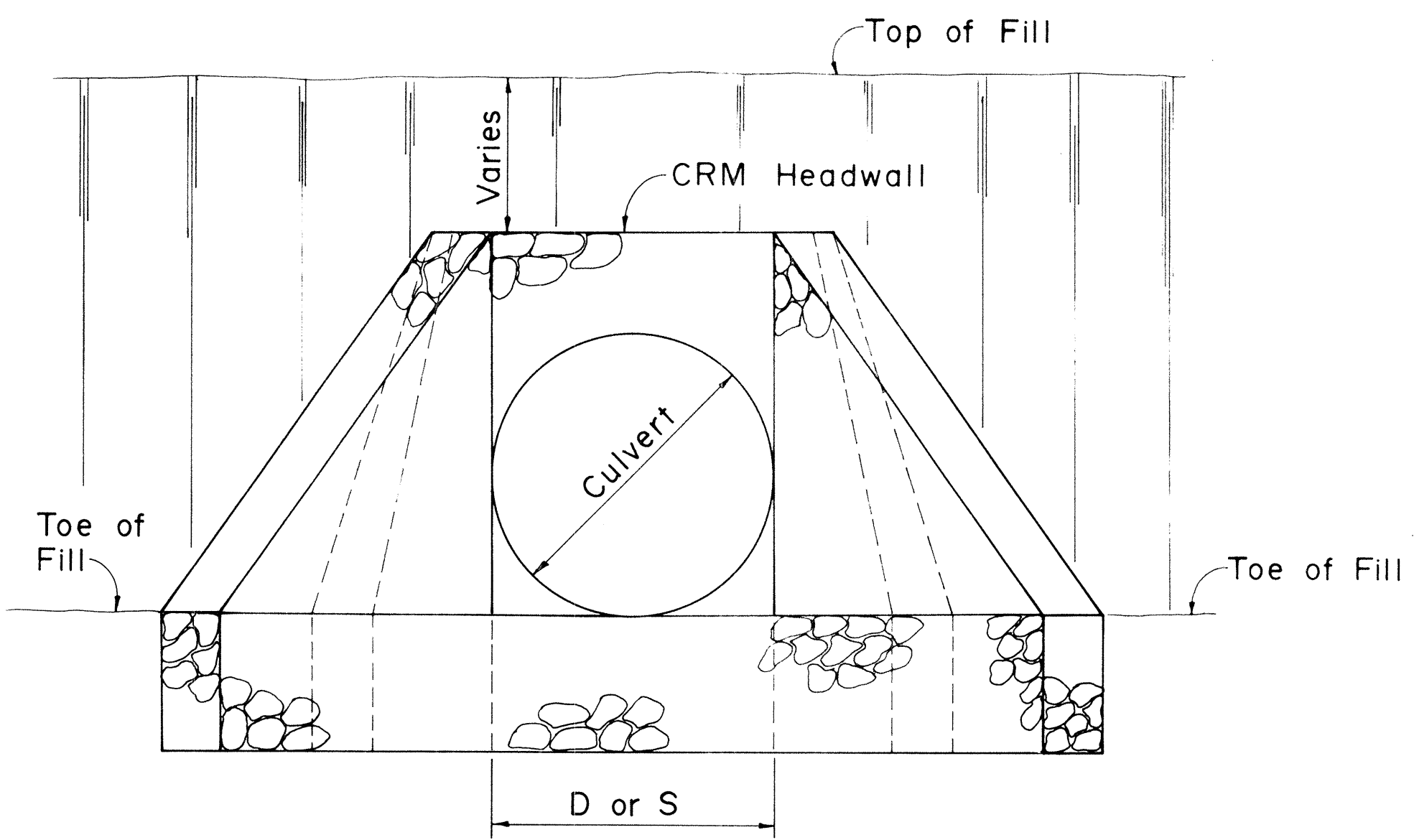
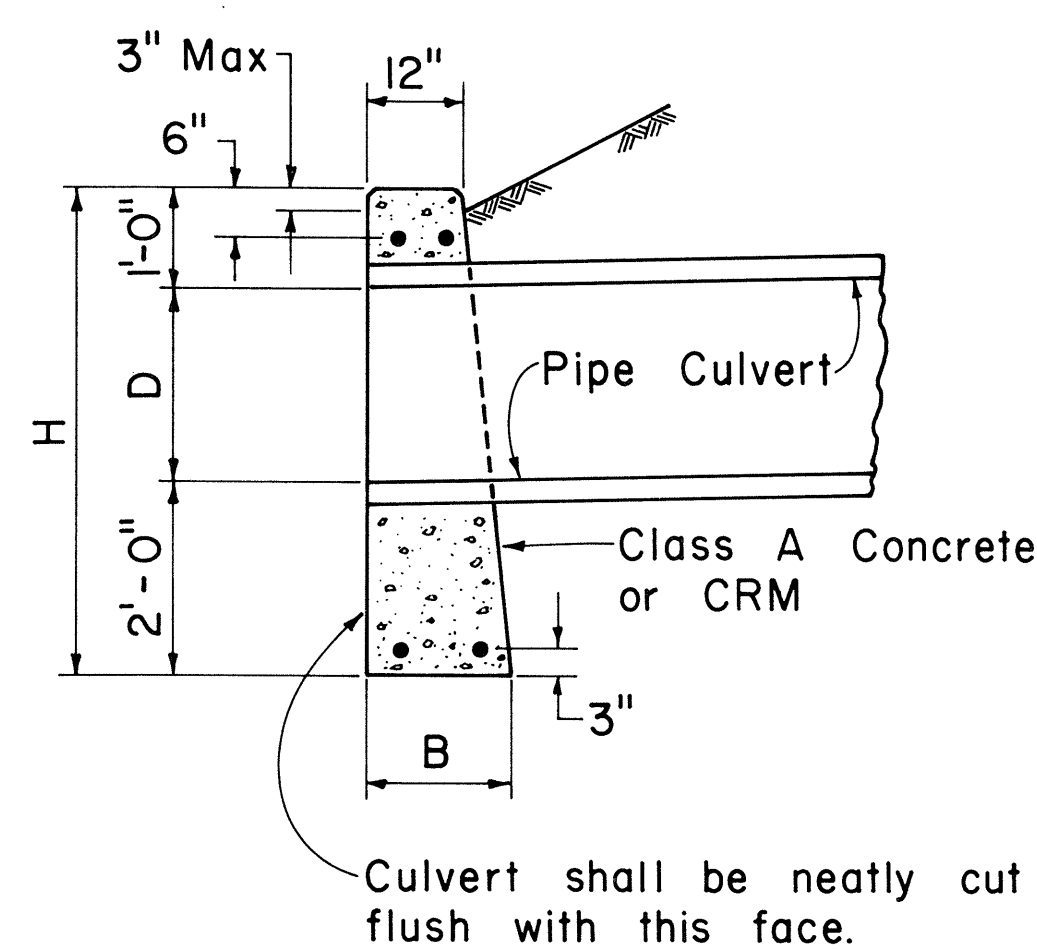
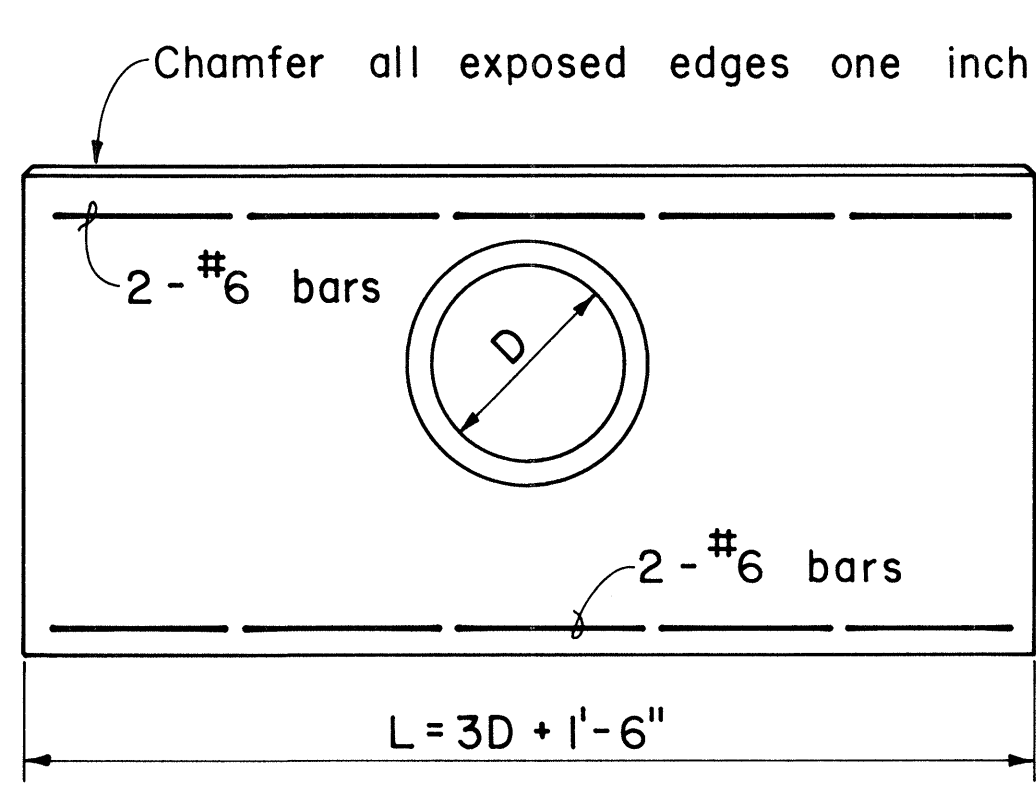
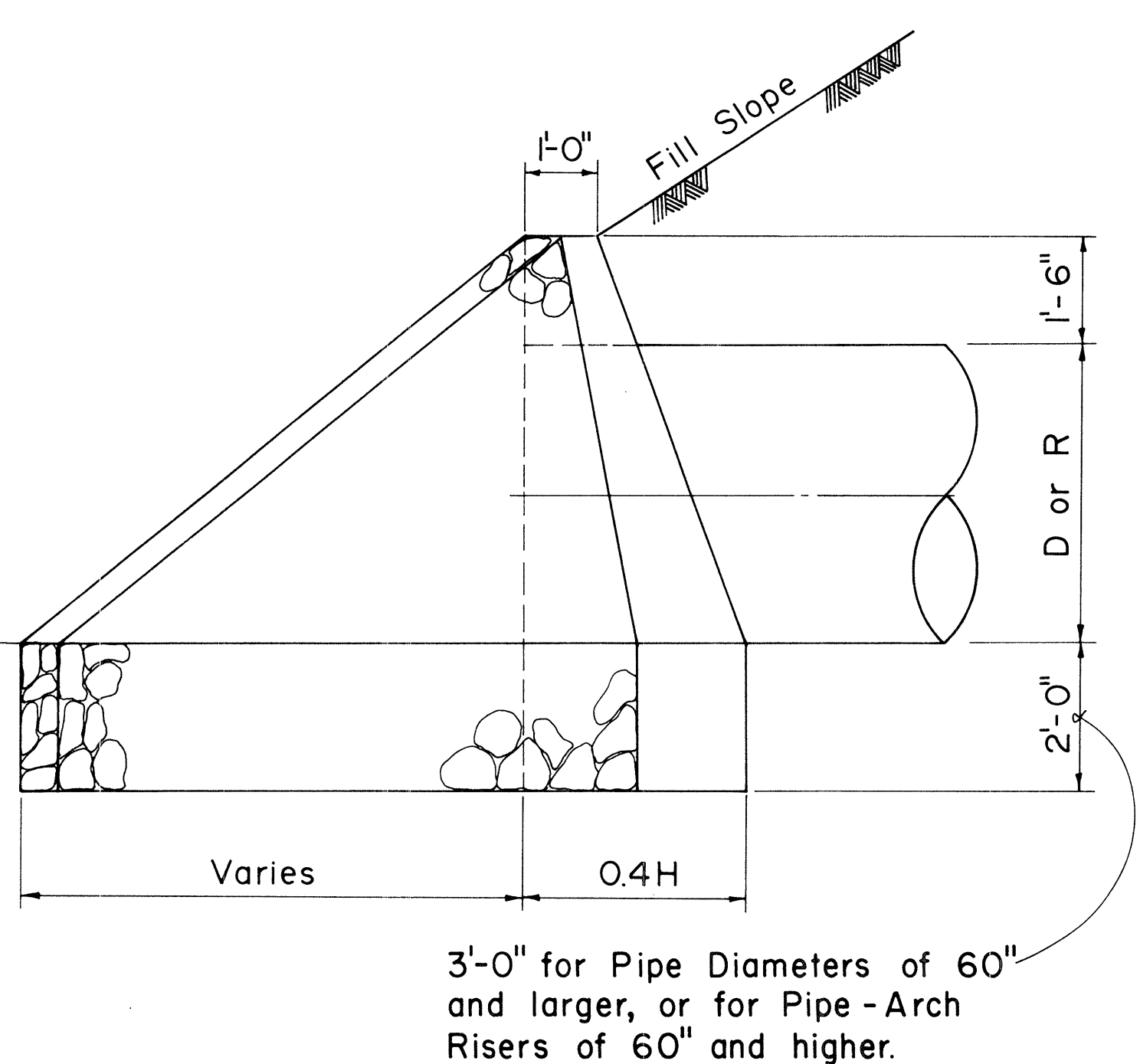
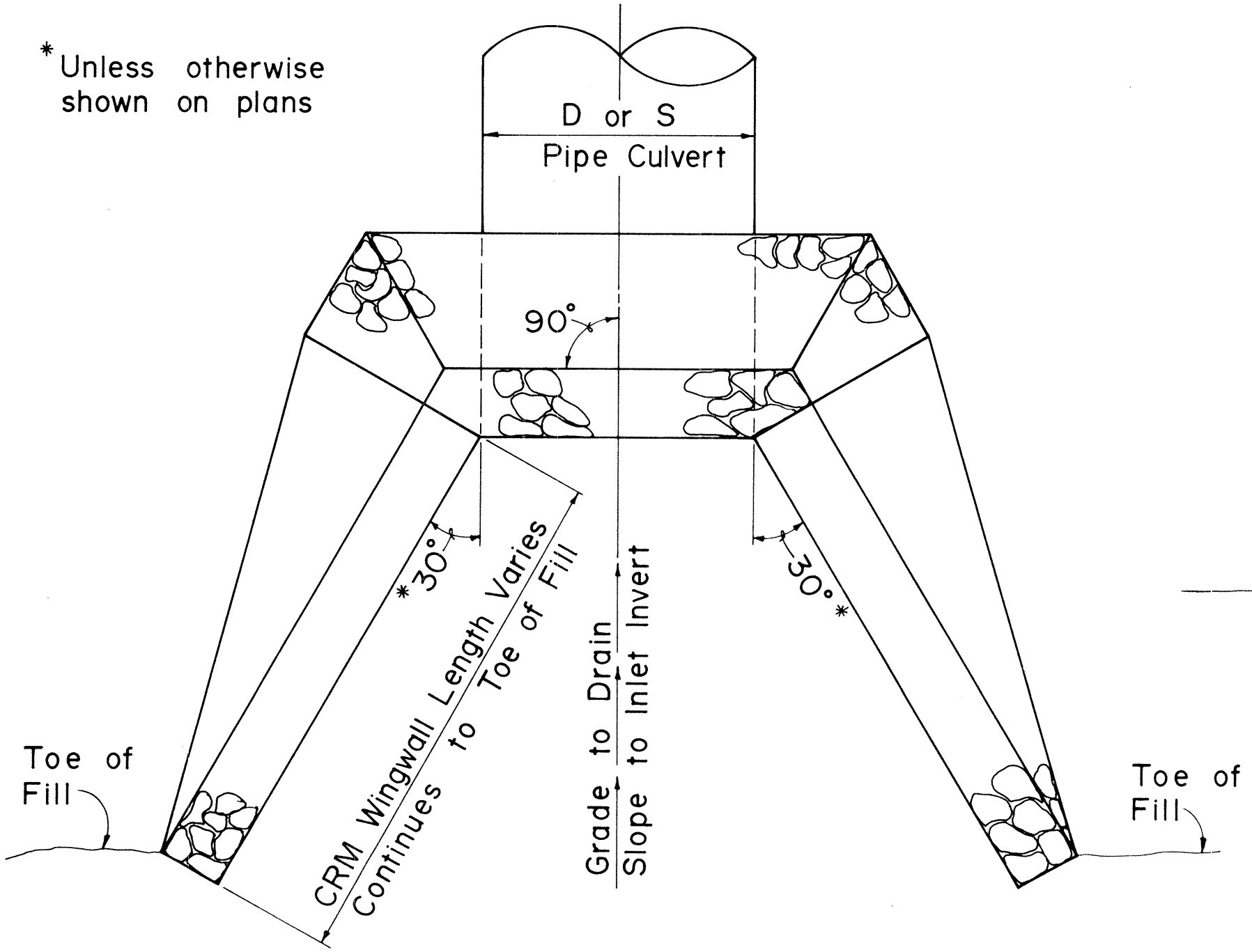
SECTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DRAINAGE PLAN
KAWAIIAE ROAD SAFETY IMPROVEMENTS
PHASE II
Waimea To Kawaihae
F.A. PROJECT No. HE5-0100(28)
Scale: As Noted Date: May, 1986
SHEET No. H5 OF 7 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HE5-000(20)	1986	15	67



NOTE:
D = Diameter of Pipe Culvert
R = Rise of Pipe-Arch Culvert
S = Span of Pipe Arch Culvert

DATA FOR CONC. HDWL.			
D	B	L	H
18"	1'-6"	6'-0"	4'-6"
24"	1'-6"	7'-6"	5'-0"
30"	2'-0"	9'-0"	5'-6"
36"	2'-0"	10'-6"	6'-0"
42"	2'-6"	12'-0"	6'-6"
48"	2'-6"	13'-6"	7'-0"

DATA FOR CRM HDWL.			
D	B	L	H
18"	1'-9"	6'-0"	4'-6"
24"	2'-0"	7'-6"	5'-0"
30"	2'-3"	9'-0"	5'-6"
36"	2'-6"	10'-6"	6'-0"

CONCRETE OR CRM HEADWALL

APPROVAL RECOMMENDED:
P. Takano 6-19-79
HYDRAULIC DESIGN ENGINEER DATE

APPROVED:
Herbert Takashi 6-22-79
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1.	Supersedes Sht. DH 16 approved 12-17-69	H.P.	6/22/79
2.	Supersedes Sht. DH 10 approved 6-79 and Sht. DH 16 approved 6-79	OTM C	10/7/85

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

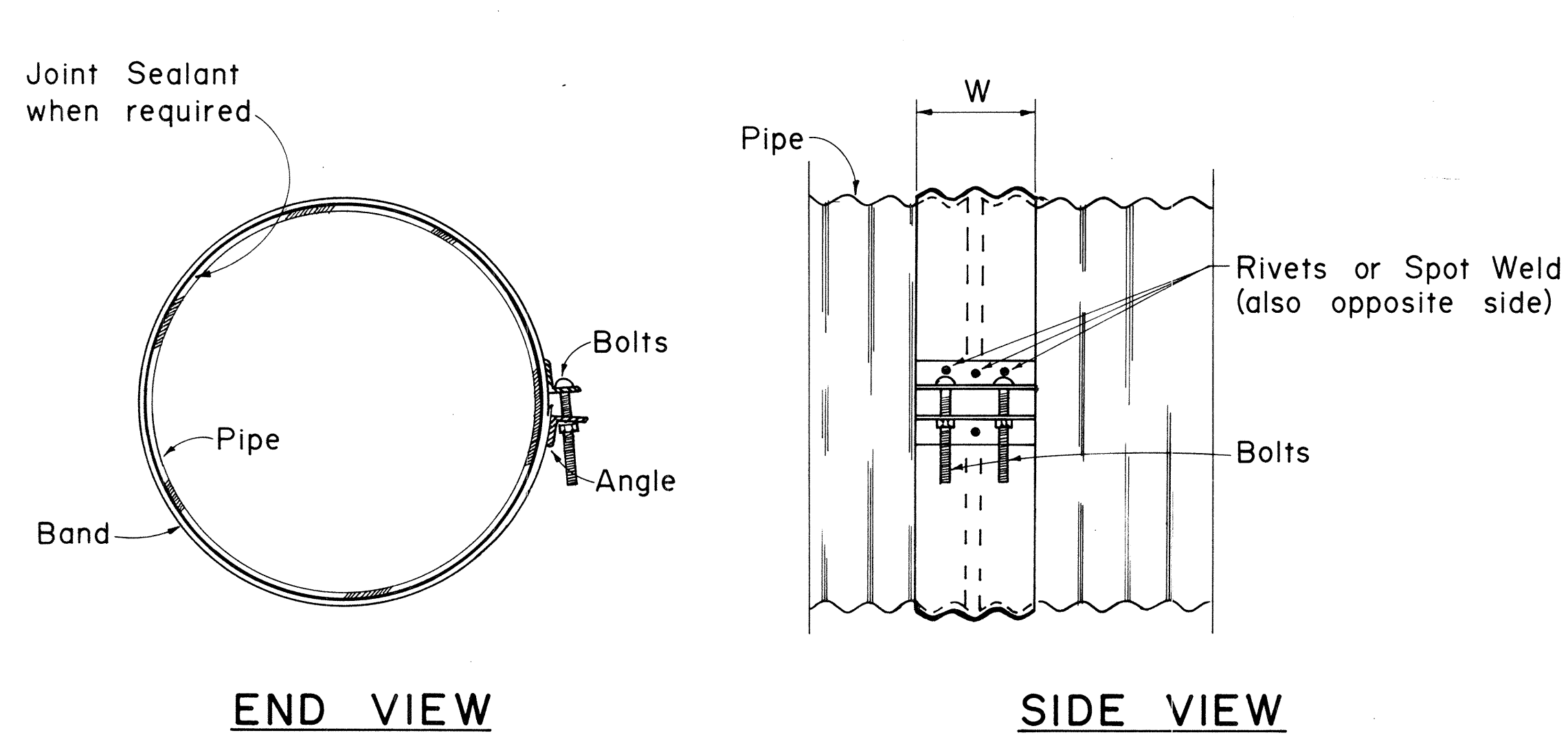
CONCRETE AND CEMENT
RUBBLE MASONRY STRUCTURES

Not To Scale Date: Dec. 1977

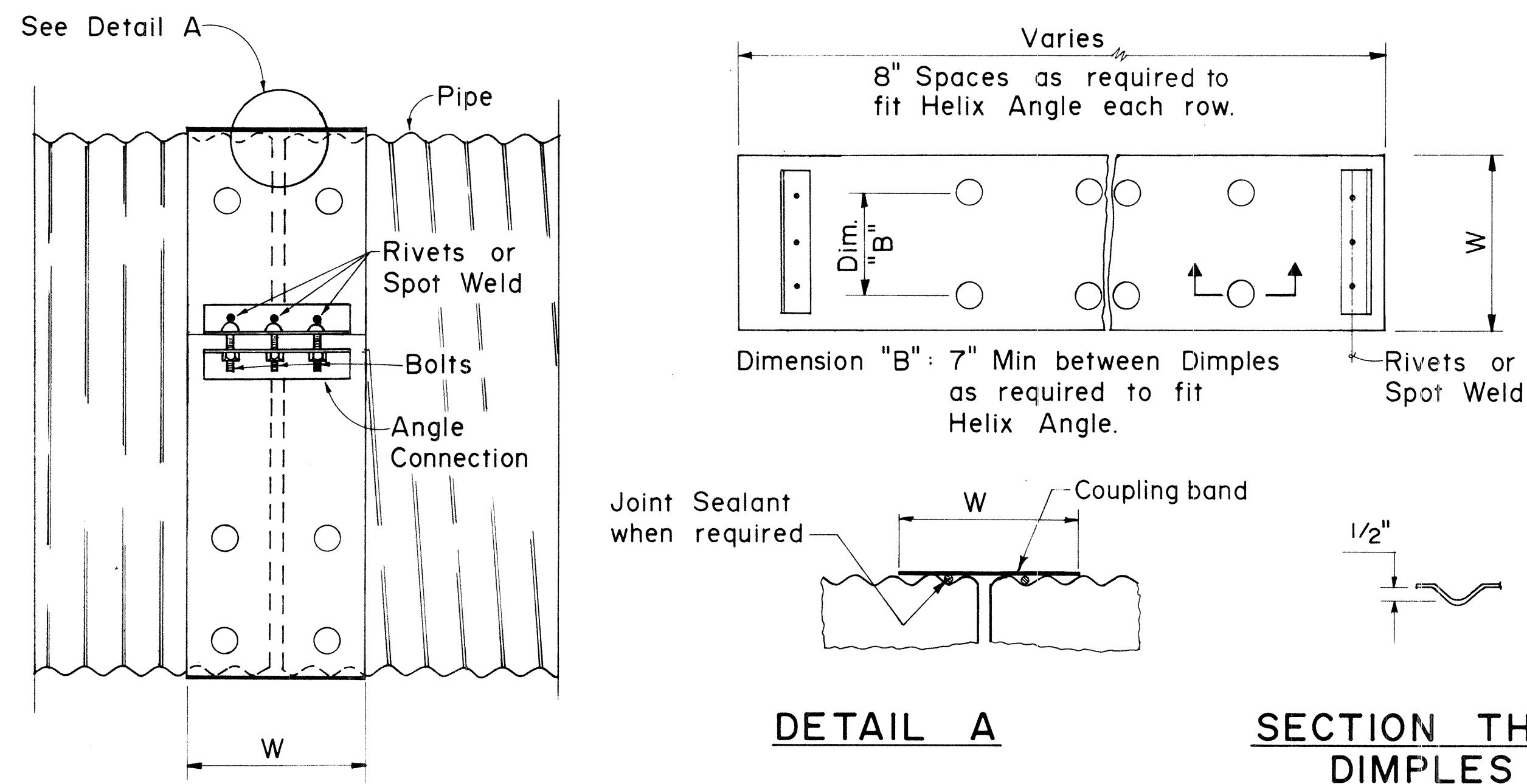
CEMENT RUBBLE MASONRY STRUCTURE

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

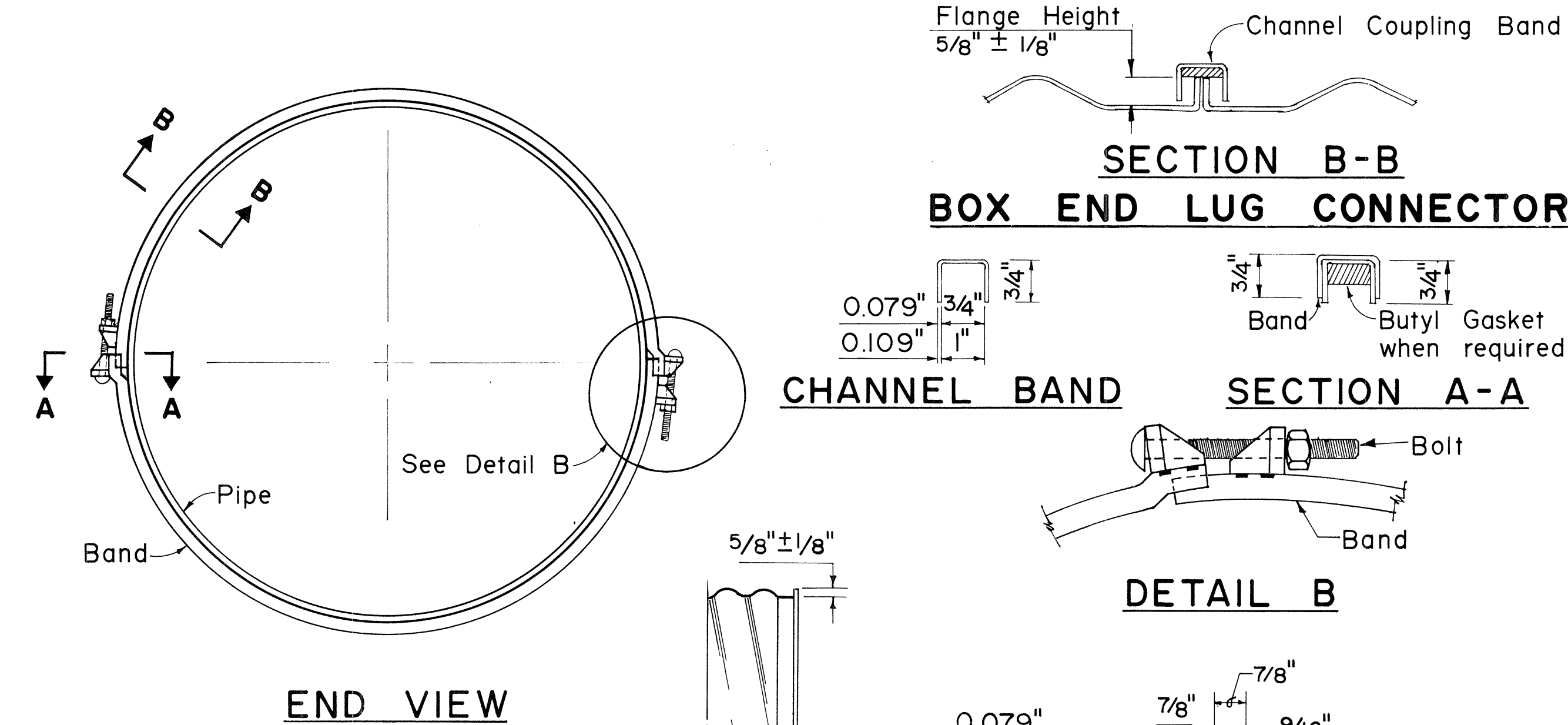
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	1125-000(28)	1986	16	67



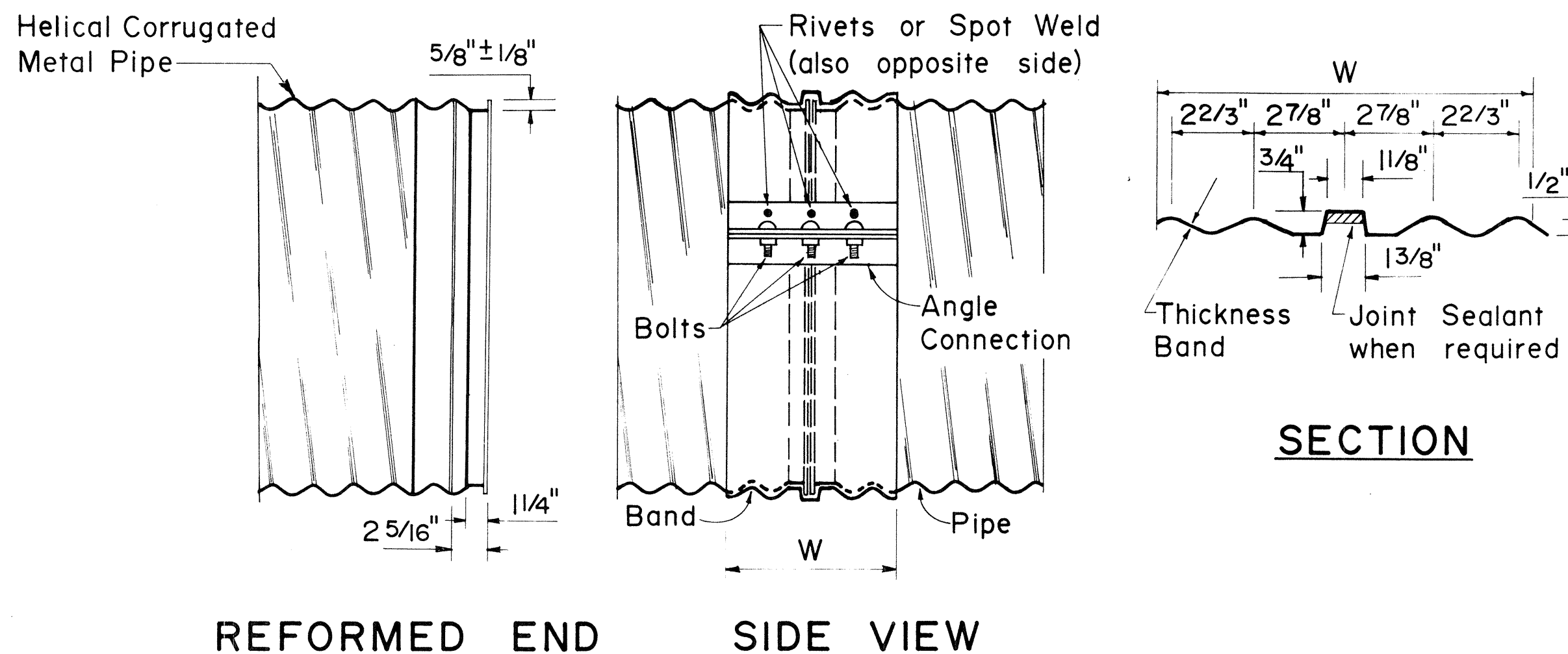
ANNULAR COUPLING BAND



UNIVERSAL COUPLING BAND ANGLE CONNECTION



CHANNEL COUPLING BAND FOR USE ON REFORMED END C.M.P.



WING CHANNEL COUPLING BAND FOR REFORMED END H.C.M.P.

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	ANGLE CONNECTIONS-QUANTITIES PER CONNECTION			
					DIMENSIONS	BOLTS	RIVETS	SPOT WELD
UNIVERSAL	2 2/3 x 1/2	12 - 36	10 1/2	0.075-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 60	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		66-84	16 1/2	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
	3 x 1	36- 72	10 1/2	0.075-0.138	2ea 2x2x3/16 x 7	2 ea 1/2 x 6	3ea 3/8	
		78-120	16 1/2	0.075-0.138	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
ANNULAR	2 2/3 x 1/2	12 - 36	7	0.075-0.138	2ea 2x2x3/16x 7	2 ea 1/2 x 6	3ea 3/8	3ea 1/2
		42- 72	12	0.075-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		78- 84	12	0.164-0.168	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
	3 x 1	36- 42	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	
		48-84	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	5ea 1/2
		90-120	14	0.075-0.109	2ea 2x2x3/16x12	3 ea 1/2 x 6	4ea 3/8	

COUPLING TYPE	CORRUGATION	PIPE SIZE	W	PIPE WALL THICKNESS	LUG TYPE CONNECTORS-QUANTITIES PER CONNECTION		
					DIMENSIONS	BOLTS	SPOT WELD
CHANNEL	2 2/3 x 1/2	12 - 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
		36 - 72		0.075-0.138	2 ea Lugs	1 ea 1/2 x 6	4 ea 1/2
WING	2 2/3 x 1/2	12 - 72	12	0.075-0.138	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
		78 - 84	12	0.164-0.168	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2
		36 - 120	12	0.075-0.109	6 ea Lugs	3 ea 1/2 x 6	12 ea 1/2

APPROVAL RECOMMENDED:
P. Palano
 HYDRAULIC DESIGN ENGINEER 9-7-79 DATE
 APPROVED:
Shirley B. Palano
 ASSISTANT CHIEF, ENGINEERING 9-14-79 DATE

NO.	REVISION	APPROVED BY	DATE
1.	Revise pipe wall thickness from table and delete note #6.	<i>PS</i>	4-7-83

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
C.M.P. COUPLING DETAILS
STANDARD JOINT
Not To Scale Date: Sept. 1979
SHEET No. 17 OF 7 SHEETS DH22

16